

Attachment "C"

RASGAS

Tender Response Requirements

Question 6

Detailed Description of Technical Support

Miles Root

(b) (6)


SUMMARY OF QUALIFICATIONS

Senior level Technical Professional with extensive experience in laboratory management, experimental design, methods development, and troubleshooting of various chemical plant processes, analytical processes, and business systems to achieve continuous improvement in operational, quality, safety & environmental excellence. This experience includes direct process support to plant systems such as distillation, ion exchange, CEMS, heat exchange, blending, boilers, and deep well injection systems; analytical development of systems such as GC/MS, HPLC, and XRF; and laboratory management of personnel.

EDUCATION

1974 B.S. Chemistry Northern Illinois University

PROFESSIONAL EXPERIENCE

Merisol USA/Merichem Houston, TX

A specialty chemical manufacturer of phenolics, cresylic acids, and related chemicals.

1997-2007: Senior Chemist, Production Support
1980-1997: Section Leader, Raw Materials Laboratory
1976-1980 Chemist, Sales Support
1974-1976 Chemist, Quality Control Laboratory

Senior Chemist, Production Support

- Senior Chemist responsible for all plant process support and troubleshooting involving current production, new process development and quality improvement for a specialty chemical manufacturer of cresylic acids.
- Developed critical GC/MS methods to support new plant feedstock based upon coal vs. current petroleum refining processes. Performed GC/MS profile studies of all new feed stocks and plant production runs within critical time frame during plant transition.

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- Performed customer support function of non-routine testing to include experimental design, implementation and processing recommendations.
- Managed air and water environmental quality systems including CEMS, NESHAP and discharge water TCEQ reporting. Designed and installed odor control system for plant site. Designed and implemented deep well injection system improvements.
- Developed processing and waste handling plans over a period of 22 months for hazardous waste materials resulting from the cleaning and decontamination of 50 chemical storage tanks during plant feed stock transition.
- Designed and implemented testing to evaluate and recommend all PPE for plant.
- Designed and implemented experimentation resulting in construction of high purity storage tank for freezable product saving \$250K per year in outside storage costs.
- Extensive experience with GC, GC/MS, HPLC, UV/VIS, XRF and numerous other sulfur techniques, titration systems, flame photometer, Oldershaw and other distillation methods and a wide variety of ASTM methods.

Section Leader, Raw Materials Testing Laboratory

- Managed 2-6 chemists. Responsible for all hiring, firing, training, development, safety and record keeping functions.
- Managed laboratory responsible for testing of all incoming feed stock which included UV/VIS, combustion, XRF and potentiometric sulfur techniques, and a wide variety of wet chemical methods and GC analysis.
- Evaluated supplier refinery process streams associated with the cresylic acid business, including various spent caustic and naphtha streams, to maximize recovery of cresylics at lowest cost. Included working with various refineries world wide on implementing numerous analytical testing methods.
- Implemented SPC, Metrics and ISO programs in section to maximize quality and continuous improvement goals.

Chemist, Sales Support

- Customer support, sample preparation and testing for customer needs.
- Performed a variety of wet chemical test methods, interface with sales and customer service to provide samples per specifications.

Chemist, Quality Control Laboratory

- Progression from senior analyst to Chemist.
- Performed routine tests in quality control laboratory on a rotating shift basis.
- Extensive use of GC and wet chemical tests.

References

Will be provided upon request.

ENGINEERING & TECHNICAL SUPPORT

CGH Associates

February 2005

(b) (6)

EXPERIENCE SYNOPSIS

NAME: Clark G. Hickman

PERSONAL:

Age:
Height:
Weight:

(b) (6)

EDUCATION:

B.S. Chemical Engineering (May 1970)
West Virginia Institute of Technology, Montgomery, West Virginia

M.S. Chemical Engineering (December 1974)
West Virginia University, Morgantown, West Virginia

PROFESSIONAL: Registered Professional Engineer
(Texas No. 46539)

CURRENT: Principal, CGH Associates

AREAS OF EXPERIENCE: Project, Chemical, and Environmental Services

EXPERIENCE: Mr. Hickman has over 34 years of engineering experience. During this period, he has served in the capacities of President, Plant Manager, Plant Environmental Manager, Chief Engineer, Senior Project Engineer, Project Engineer, Plant Engineer, and Engineer I and II. He has extensive background in environmental services and project engineering.

Areas of specialization include the design and operation of commercial waste disposal facilities used for wastewater treatment, incineration, deepwell injection, and landfill disposal of industrial wastes. Mr. Hickman is an expert in air pollution control systems, such as scrubbers, baghouses, and wet electrostatic precipitators used on waste incinerators. His waste disposal experience includes liquid waste incineration, kiln incineration, fluidized bed incineration, deepwell injection, wastewater treatment systems, and landfill operations.

Specific projects on which Mr. Hickman has worked include a 100M gal/day commercial hazardous/non-hazardous wastewater treatment facility, a 200M gal/day-\$4MM commercial deepwell disposal facility, a 15MM lb/yr-\$1.3MM drum conveying solid shredding system, a 500M gal-\$2MM waste liquids tank storage system, a 8MM lb/yr-\$0.25MM lime slaking system, a 120MM Btu/hr kiln-afterburner incineration system with scrubber, an economic technical evaluation of a 460MM Btu/hr fluidized bed incineration system with two 135M lb/hr boilers, and design of a 230MM Btu/hr kiln-fluid bed chemical waste incineration site. Other areas of experience include hazardous waste facility closure plans. Texas Commission on Environmental Quality (TCEQ)/Environmental Protection Agency (EPA) RCRA Part A and B Permit Applications (including 230MM Btu/hr hazardous waste incineration site) unsaturated and saturated ground water monitoring system installations.

Mr. Hickman is also experienced in supervising legal teams associated with the process of obtaining TCEQ/EPA RCRA Permits and the issues of local control or ordinances.

FORMERLY ASSOCIATED WITH:

- Houston Chemical Services, Inc.
- United States Aluminate Company – Texas
(Southern Ionics Incorporated)
- GAF Corporation (ISP)
- S&B Engineers, Inc.
- Rollins Environmental Services (TX), Inc.
- Empak, Inc.
- E. I. duPont de Nemours and Company
- West Virginia Air Pollution Control Commission

The Wonderful World of Spent Caustic

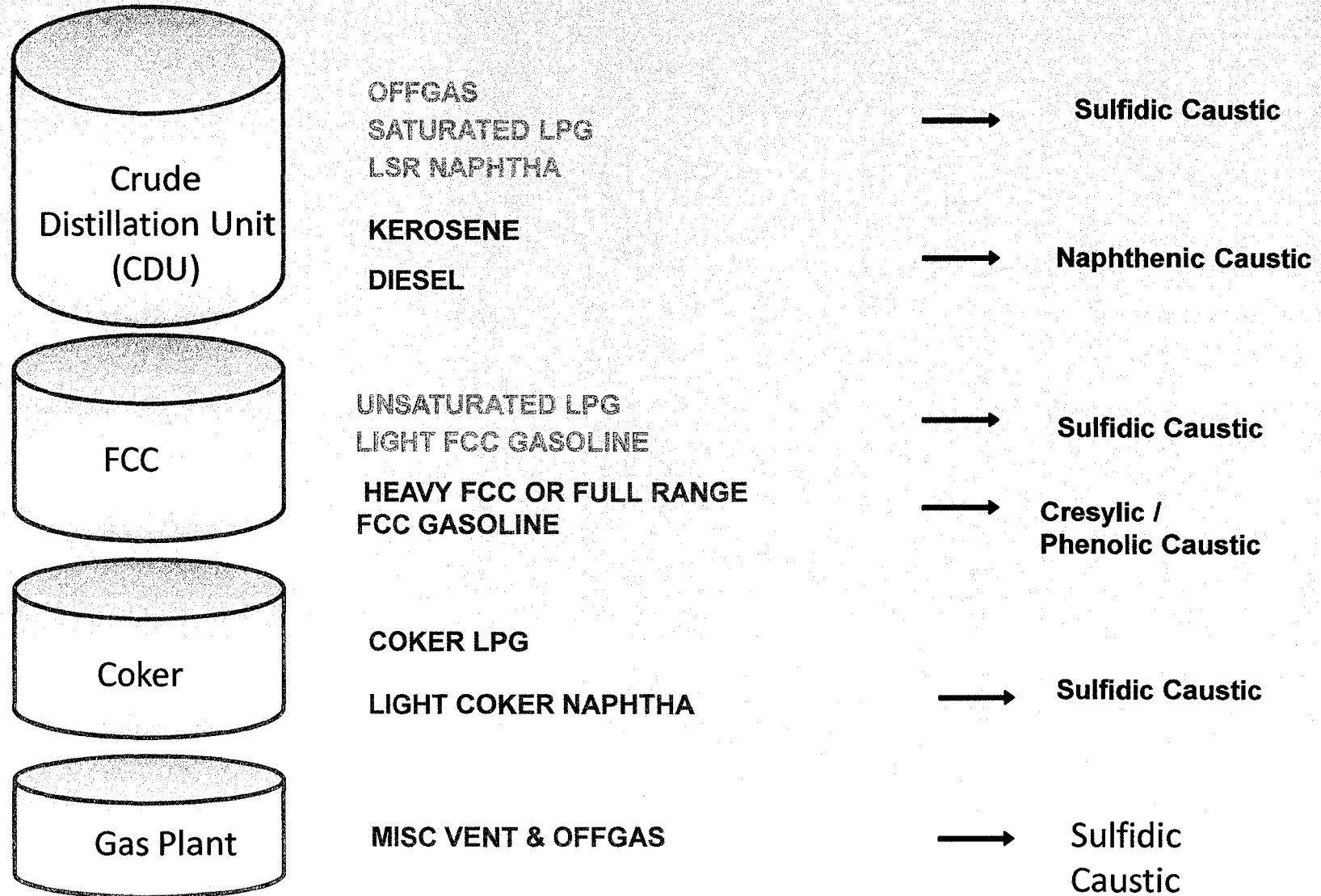
Sources of Spent Caustic

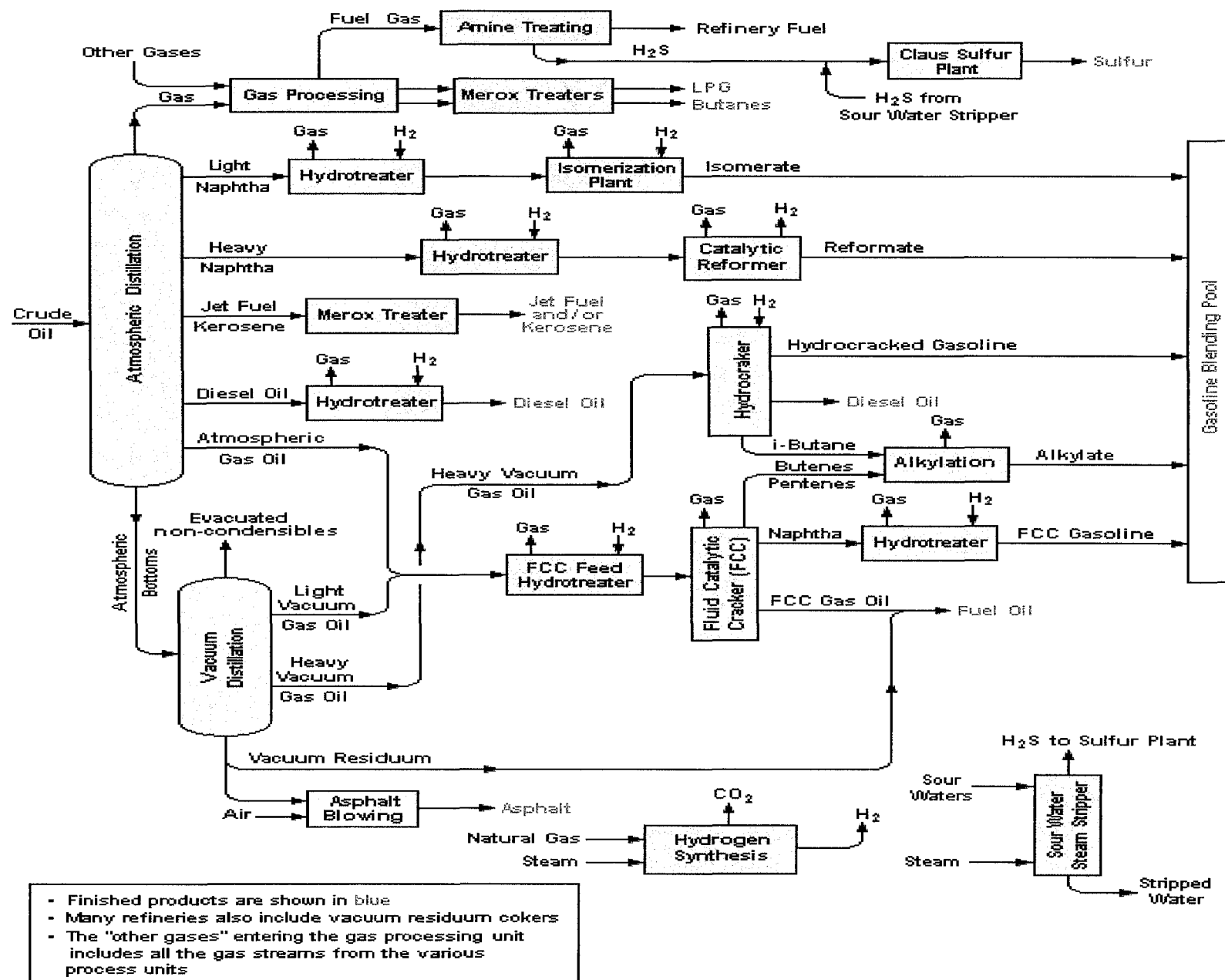
- **Ethylene spent caustic** comes from the caustic scrubbing of cracked gas from an ethylene cracker. This liquor is produced by a caustic scrubbing tower. Ethylene product gas is contaminated with $\text{H}_2\text{S}(\text{g})$ and $\text{CO}_2(\text{g})$, and those contaminants are removed by absorption in the caustic scrubbing tower to produce $\text{NaHS}(\text{aq})$ and $\text{Na}_2\text{CO}_3(\text{aq})$. The sodium hydroxide is consumed and the resulting wastewater (ethylene spent caustic) is contaminated with the sulfides and carbonates and a small fraction of organic compounds. These types of caustics typically contain less than 5% caustic.
- **Refinery spent caustic** comes from multiple sources: the caustic processing of gasoline; the caustic processing of kerosene/jet fuel; and the caustic processing of LPG. In these streams sulfides and organic acids are removed from the product streams into the caustic phase. The sodium hydroxide is consumed and the resulting wastewaters (cresylic for gasoline; naphthenic for kerosene/jet fuel; sulfidic for LPG -spent caustics) are often mixed and called **refinery spent caustic**. This spent caustic is contaminated with sulfides, carbonates, and in some cases a high fraction of organic acids.



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Refinery Sources





MAJOR REFINERY PRODUCTS

- **Gasoline.** The most important refinery product is motor gasoline, a blend of hydrocarbons with boiling ranges from ambient temperatures to about 400 °F. The important qualities for gasoline are octane number (antiknock), volatility (starting and vapor lock), and vapor pressure (environmental control). Additives are often used to enhance performance and provide protection against oxidation and rust formation.
- **Kerosene.** Kerosene is a refined middle-distillate petroleum product that finds considerable use as a jet fuel and around the world in cooking and space heating. When used as a jet fuel, some of the critical qualities are freeze point, flash point, and smoke point. Commercial jet fuel has a boiling range of about 375°-525° F, and military jet fuel 130°-550° F. Kerosene, with less-critical specifications, is used for lighting, heating, solvents, and blending into diesel fuel.
- **Liquified Petroleum Gas (LPG).** LPG, which consists principally of propane and butane, is produced for use as fuel and is an intermediate material in the manufacture of petrochemicals. The important specifications for proper performance include vapor pressure and control of contaminants.
- **Distillate Fuels.** Diesel fuels and domestic heating oils have boiling ranges of about 400°-700° F. The desirable qualities required for distillate fuels include controlled flash and pour points, clean burning, no deposit formation in storage tanks, and a proper diesel fuel cetane rating for good starting and combustion.

Refinery Products - Continued

Residual Fuels. Many marine vessels, power plants, commercial buildings and industrial facilities use residual fuels or combinations of residual and distillate fuels for heating and processing. The two most critical specifications of residual fuels are viscosity and low sulfur content for environmental control.

Coke and Asphalt. Coke is almost pure carbon with a variety of uses from electrodes to charcoal briquets. Asphalt, used for roads and roofing materials, must be inert to most chemicals and weather conditions.

Solvents. A variety of products, whose boiling points and hydrocarbon composition are closely controlled, are produced for use as solvents. These include benzene, toluene, and xylene.

Petrochemicals. Many products derived from crude oil refining, such as ethylene, propylene, butylene, and isobutylene, are primarily intended for use as petrochemical feedstock in the production of plastics, synthetic fibers, synthetic rubbers, and other products.

Lubricants. Special refining processes produce lubricating oil base stocks. Additives such as demulsifiers, antioxidants, and viscosity improvers are blended into the base stocks to provide the characteristics required for motor oils, industrial greases, lubricants, and cutting oils. The most critical quality for lubricating-oil base stock is a high viscosity index which provides for

Why Some Refiners do not Treat Spent Caustic in the WWTP*

- 1. Organic content can be quite large and vary in concentration. COD can be over 600,000 ppm. This can overload the WWTP**
- 2. Phenols and cresols that are present in significant concentrations typically have very low discharge limits. Often less than 1 ppm.**
- 3. Odor from spent caustic can be a significant problem in sensitive areas.**
- 4. Sodium Naphthenate is a very effective soap that can cause fouling of equipment, stable emulsions reducing skimming efficiencies, and problems with the drying of the sludge generated from the WWTP.**
- 5. Expansion of WWTP can cost tens of millions of dollars. New permits for expansion may be difficult to obtain.**

* WWTP = Waste Water Treating Plant

Refinery Options for Spent Caustic

- Treat internally in own WWTP – Most economical if in place. New WWTP for refineries and chemical plants cost over 10 million dollars.
- Purchase treating equipment – Oxidizers- Cost is typically over 5 million dollars for this type of equipment. Merichem and Zimpro are the largest suppliers of this type of technology.
- Send off site for incineration – High costs, goes out as waste.
- Deep well injection – Intermediate cost, however not all caustics can be injected easily.
- Sending off-site for reuse as pulping chemical or other approved use.

Why Refiners Caustic Treat

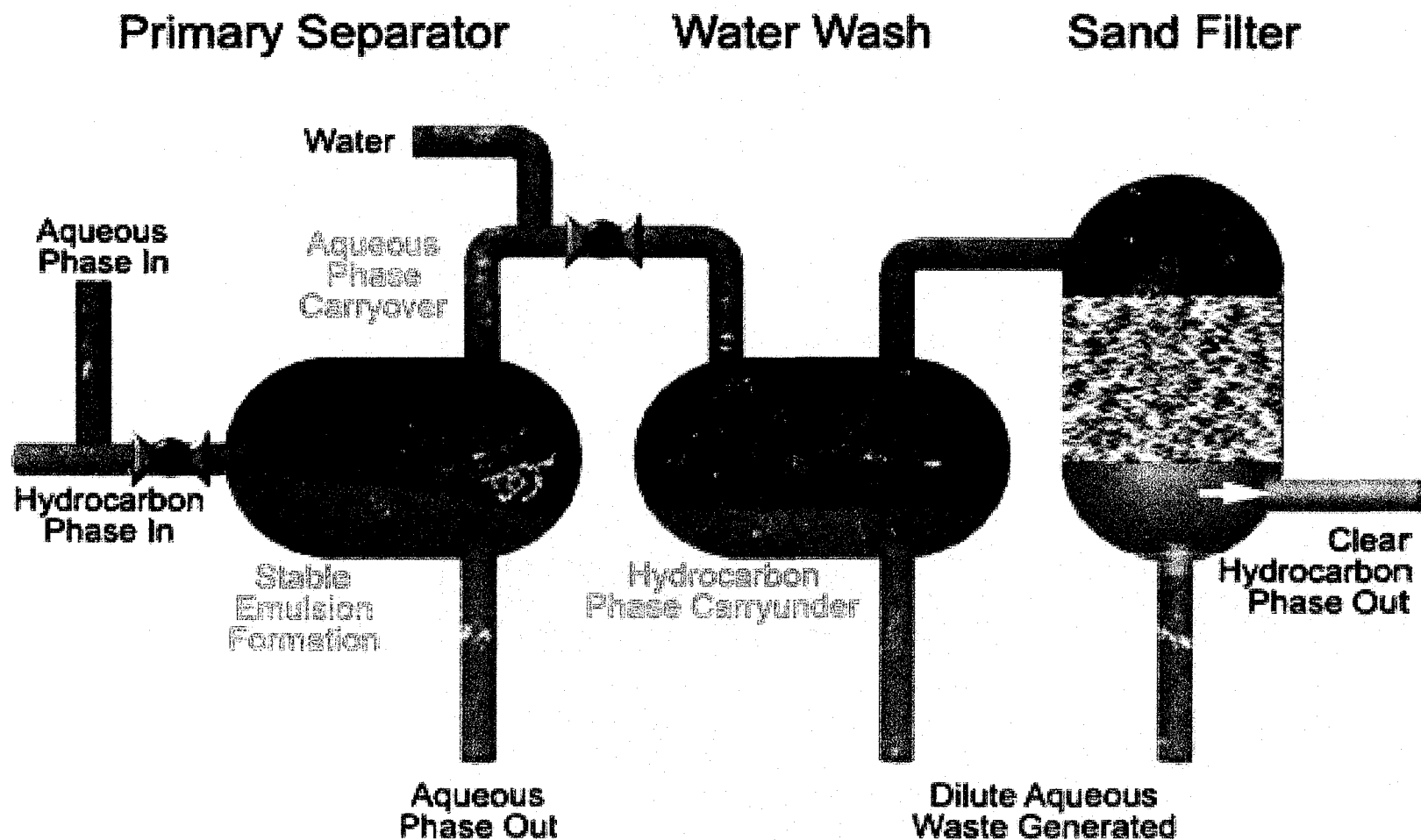
1. **Reduce Hydrogen Sulfide Content-** Refiners usually treat LPG and light naphtha with 10 to 15% caustic. If the concentration of hydrogen sulfide is very high, refiners will typically treat with amines instead of caustic since they can be regenerated more easily.
2. **Reduce acidity of Kerosene–** Dilute caustic extraction (~2° to 8°Be) typically reduces acidity to less than 0.03 mg KOH/g. Strong caustic can not be used in higher TAN applications due to stable emulsion formation when strong caustic reacts with naphthenic acid.
3. **Reduce Mercaptan Content –** Stronger Caustic (generally 15° to 25°Be mixed with a cobalt catalyst) reduces the mercaptan content to help meet mercaptan specifications and pass Doctor tests.
4. **Reduce Corrosion -** In some cases, caustic treating is needed to pass either silver strip or copper strip tests.
5. **Most Cost Effective -** Caustic treating is the most cost effective method to reduce acidity and mercaptan content. Caustic treating is typically 1/10 the cost of hydrotreating. Typical hydrotreaters cost 20 to 50 Million dollars. Caustic treaters cost 2 to 4 Million dollars.

Types of Caustic Treaters

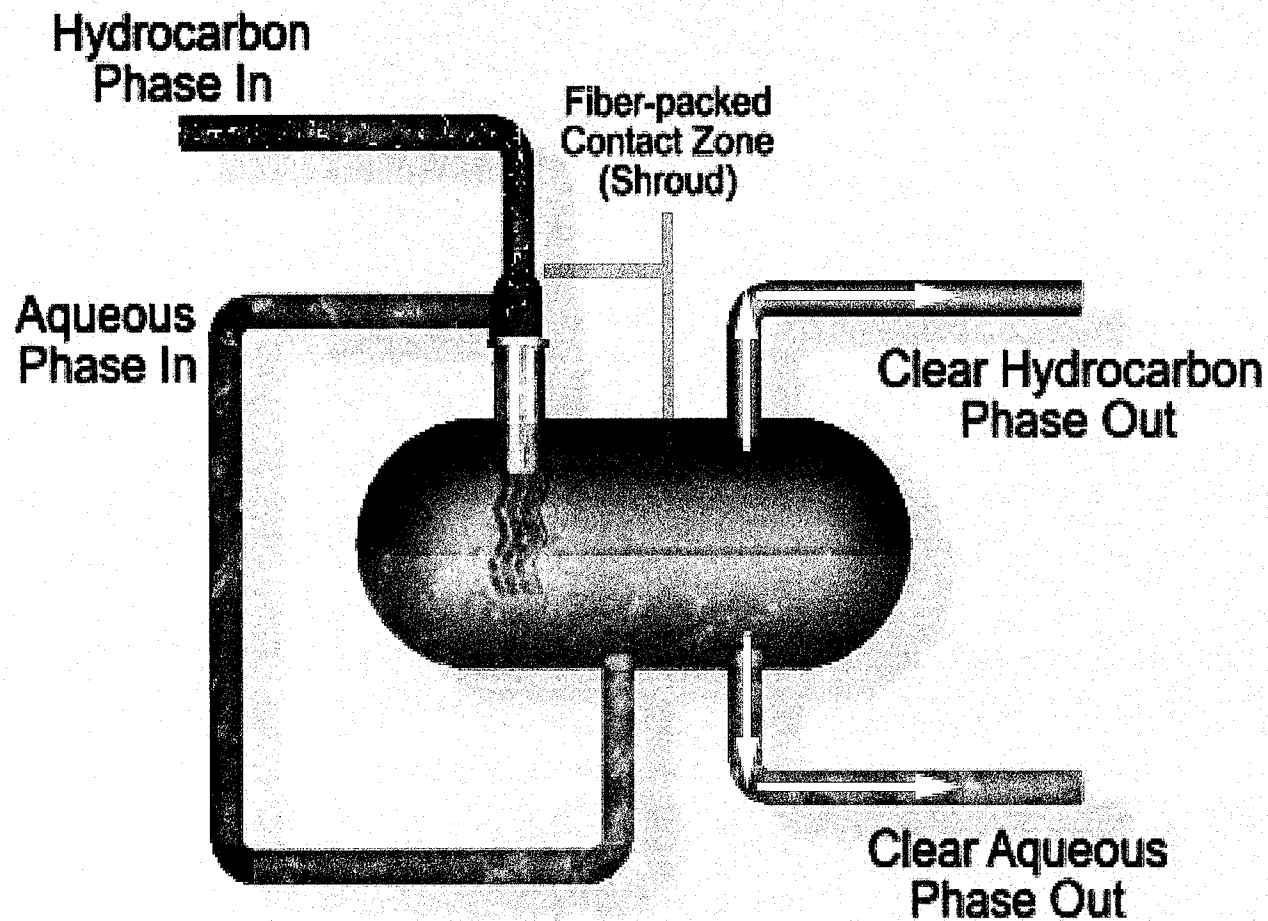
There are three major types of caustic treaters:

- 1) Merichem Fiber-Film Treaters – Uses proprietary fiber technology as the mixing device. Caustic strength is usually higher when compared to Merox Treaters. Most treaters sold today are Merichem treaters.
- 2) UOP Merox treaters- Uses mix valve technology. Typically caustic strength is lower in caustic concentration. This technology was very popular years ago. Many Merox treaters are still being used.
- 3) In house caustic treaters – Comes in all shapes and sizes. Developed by the plant or third party engineering companies.

Typical Caustic Treater

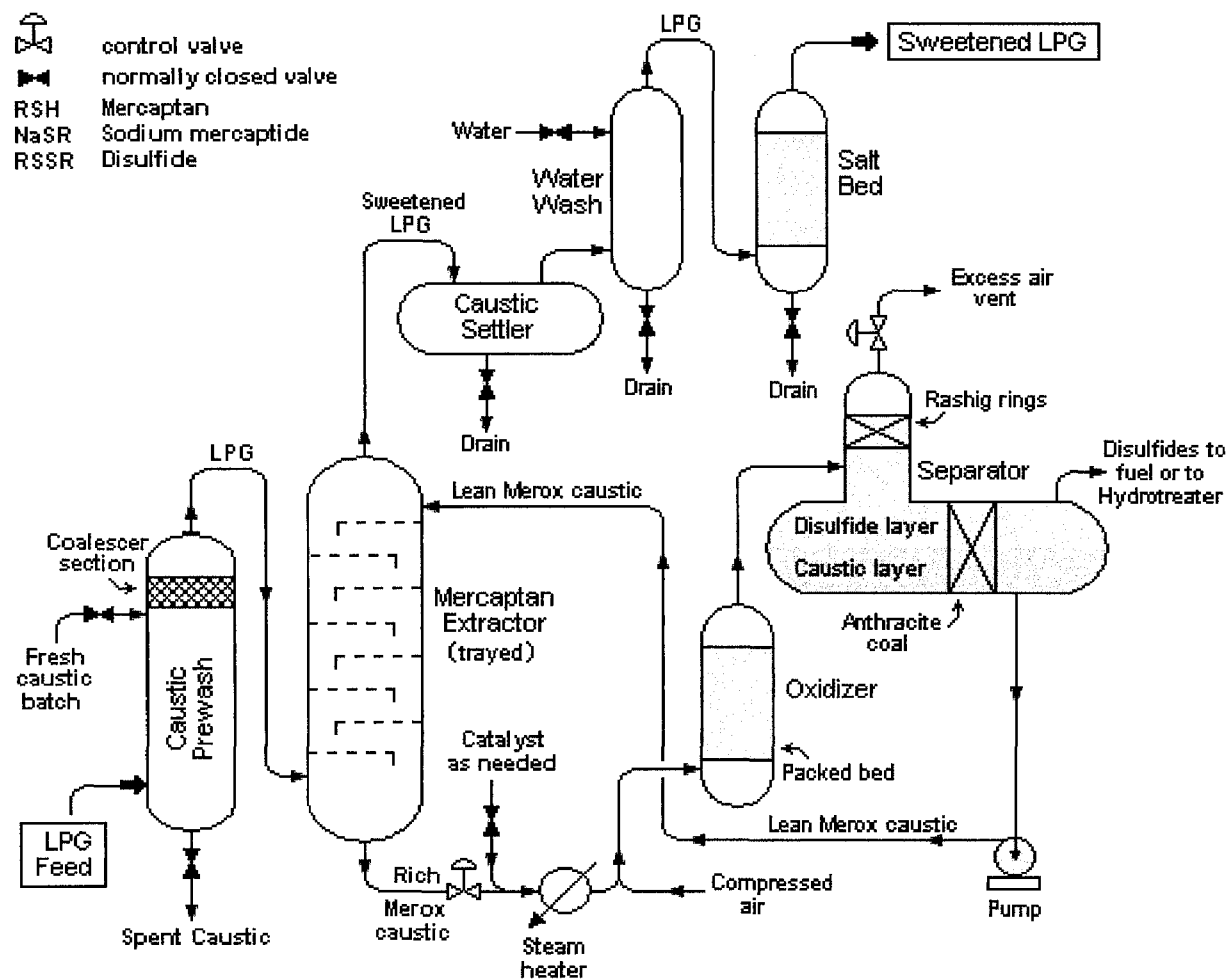


Typical Merichem Fiber-film Unit



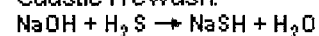
Merox Treater

- **Merox™** is an acronym for mercaptan (thiol) oxidation. It is a proprietary catalytic chemical process developed by Universal Oil Products (UOP) and used in oil refineries and natural gas processing plants to remove mercaptans from LPG, propane, butanes, light naphthas, kerosene and jetfuel by converting them to liquid hydrocarbon disulfides.
- The Merox process requires an alkaline environment which, in some of the process versions, is provided by an aqueous solution of sodium hydroxide (NaOH), a strong base, commonly referred to as *caustic*.
- The catalyst (cobalt based) in some versions of the process is a water-soluble liquid. In other versions, the catalyst is impregnated onto charcoal granules.
- Processes within oil refineries or natural gas processing plants that remove mercaptans and/or hydrogen sulfide (H_2S) are commonly referred to as *sweetening* processes because they results in products which no longer have the sour, foul odors of mercaptans and hydrogen sulfide. The liquid hydrocarbon disulfides may remain in the sweetened products, they may be used as part of the refinery or natural gas processing plant fuel, or they may be processed further.
- The Merox process is usually more economical than using a catalytic hydrodesulphurization process for much the same purpose.

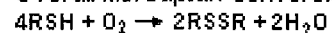


CHEMICAL REACTIONS IN LPG MEROX TREATING

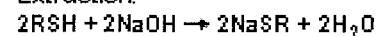
Caustic Prewash:



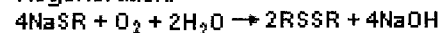
Overall Mercaptan Conversion:



Extraction:



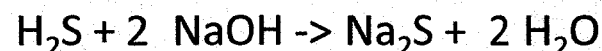
Regeneration:



Spent Caustic Composition

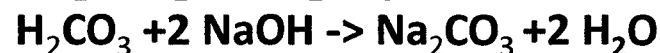
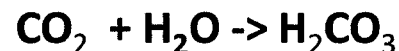
Sodium Hydroxide- Residual amount of sodium hydroxide are typical in most spent caustics. Concentrations vary from 2 to 30 wt%.

Sodium Sulfide- Produced from the reaction with Hydrogen Sulfide (H₂S) from light distillates or vent gas scrubbing.



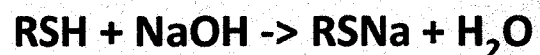
Sodium Phenolate and Cresylate – Produced from the reaction with phenol and cresylic acid. These compounds are formed in refinery FCC unit. This type of caustic is generally referred to as **Cresylic** or **Phenolic Caustic**.

Sodium Carbonate – This is primarily produced from vent gas scrubbing of CO₂

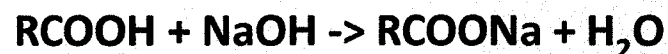


Composition (Continued)

Sodium Mercaptide- This compound is formed from the reaction with mercaptans (thiols).



Sodium Naphthenates - Produced from the reaction with naphthenic acid. This caustic is produced from the caustic treating of jet fuel, kerosene, or diesel. This type of caustic is referred to as **Naphthenic Caustic**.



Dissolved Organics- Organics are often soluble in various concentrations in spent caustics.

Amines (DEA, MEA etc.)- Amines are often found in spent caustics in concentrations of 0 to 15 wt%. Amines are often found in processes is often found where Amine treating upstream of caustic treating. This is most common where Amines are used to treat LPG where there is carryover to a caustic polishing unit.

Typical Characteristics of Refinery Spent Sulfidic and Phenolic Caustic

Parameter	Range
pH	>12
Total Organics	0 to 5 wt. %
Sodium Hydroxide	1 to 20 wt. %
Sodium Sulfide	0 to 10 wt. %
Sodium Carbonate	0 to 10 wt. %
Phenols / Cresols	1 to 10 wt. %
COD	5,000 to >200,000 ppm
Sulfur compounds	0 to 3 wt. %

Typical Characteristics of Refinery Naphthenic Caustic

Parameter	Range
pH	>12
Total Organics	3 to 30 wt. %
Sodium Hydroxide	0.5 to 5 wt. %
Naphthenic Acid	1 to 20 wt. %
Phenols / Cresols	1 to 10 wt. %
COD	50,000 to >600,000 ppm
Sulfur compounds	0 to 3 wt. %

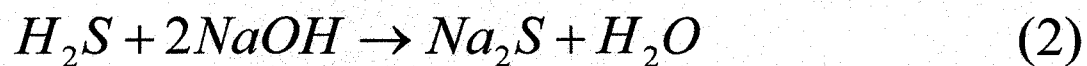
Typical Characteristics of Ethylene Caustic

Parameter	Range
pH	>12
Total Organics	1 to 2 wt. %
Sodium Hydroxide	1 to 5 wt. %
Sodium Carbonate	1 to 5 wt. %
Phenols / Cresols	0 wt. %
COD	20,000 to >60,000 ppm
Sulfur compounds	0 to 3 wt. %

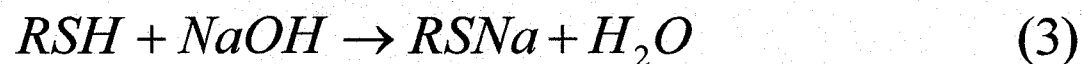
Chemical Reactions



Carbon Dioxide



Hydrogen Sulfide

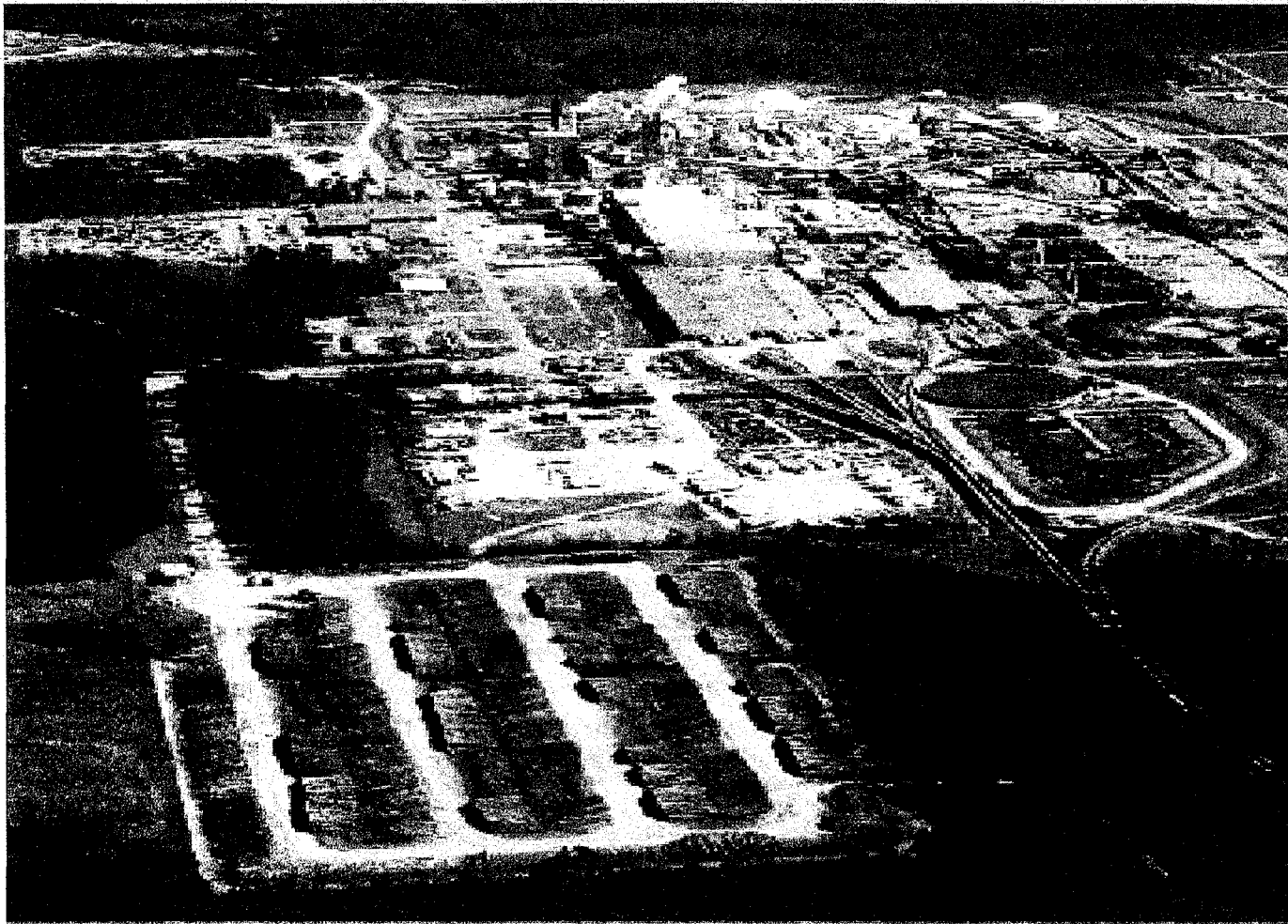


Mercaptan Sulfur



Naphthenic Acid

Kraft Mill Overview



The Kraft Process

- The **Kraft process** (also known as **Kraft pulping** or **sulfate process**) produces wood pulp which is almost pure cellulose fibers by using sodium hydroxide and sodium sulfide to extract the lignin from wood chips in large pressure vessels called digesters. Some digesters operate in a batch manner and some in a continuous process such as the Kamyr digester. Digesters producing 1,000 tones of pulp per day and more are common.
- The process name is derived from German *kraft*, meaning *strength/power*; both capitalized and lowercase names (*Kraft process* and *kraft process*) appear in the literature, but "kraft" is most commonly used in the pulp and paper industry. It was developed by Carl Dahl in 1879 and the first kraft mill started (in Sweden) in 1890. The invention of the recovery boiler by G.H. Tomlinson in the early 1930s, was a milestone in the advancement of the kraft process. It enabled the recovery and reuse of the inorganic pulping chemicals such that a kraft mill is almost closed-cycle with respect to inorganic chemicals, apart from those used in the bleaching process. This was one of the reasons that in the 1940s the kraft process took over from the sulfite process as the dominant method for producing wood pulp
- Kraft pulp makes paper that is stronger than that made from any of the other pulping processes. The sulfite process degrades cellulose more than the kraft process and degraded cellulose makes weaker fibers. Kraft pulping removes most of the lignin present originally in the wood while the mechanical pulping processes leave most of the lignin in the fibers. The hydrophobic nature of lignin interferes with the formation of the hydrogen bonds between cellulose (and hemicellulose) in the fibers needed for the strength of paper (strength refers to tensile strength and resistance to tearing).
- Kraft pulp is darker than other wood pulps, but it can be bleached to make very white pulp. Fully bleached kraft pulp is used to make high quality paper where strength, whiteness and resistance to yellowing are important.

Pulping process

- Wood chips and **white liquor**, a mixture of sodium hydroxide and sodium sulfide, produced in the recovery process, are added to the top of the digester. In a continuous digester the materials are fed at a rate which allows the pulping reaction to be complete by the time the material exit the reactor. Typically this takes several hours and is done at high temperatures (130 to 180 °C (265 to 355 °F)). These conditions break down lignin and some hemicelluloses and the fragments become soluble in the strongly basic liquid. The solid pulp (about 50% by weight based on the dry wood chips) is collected and washed. At this point the pulp is quite brown and is known as "brown stock". The combined liquids, known as black liquor (so called because of its color), contain lignin fragments, carbohydrates from the breakdown of hemicellulose, sodium carbonate, sodium sulfate and other inorganic salts.

Recovery process

- The black liquor is concentrated in multiple effect evaporator to 60% or even 80% solids ("heavy black liquor") and burned in the recovery boiler to recover the inorganic chemicals for reuse in the pulping process. Higher solids in the concentrated black liquor increases the energy and chemical efficiency of the recovery cycle, but also gives higher viscosity and precipitation of solids (plugging and fouling of equipment). The combustion is carried out such that sodium sulfate is reduced to sodium sulfide by the organic carbon in the mixture:

(CONTINUED)

Pulping Process (Continued)

1. $\text{Na}_2\text{SO}_4 + 2 \text{C} \rightarrow \text{Na}_2\text{S} + 2 \text{CO}_2$ The molten salts ("smelt") from the recovery boiler are dissolved in water to give a solution of sodium carbonate and sodium sulfide, known as "green liquor". This liquid is mixed with calcium hydroxide to regenerate the white liquor used in the pulping process (Na_2S is shown since it is part of the green liquor, but does not participate in the reaction):

2. $\text{Na}_2\text{S} + 2 \text{Na}_2\text{CO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Na}_2\text{S} + 2 \text{NaOH} + \text{CaCO}_3$ Calcium carbonate precipitates from the white liquor and is recovered and heated in a lime kiln where it is converted to calcium oxide (lime).

3. $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ Calcium oxide (lime) is reacted with water to regenerate the calcium hydroxide used in Reaction 2:

4. $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$ The combination of reactions 1 through 4 form a closed cycle with respect to sodium, sulfur and calcium.

The recovery boiler also generates high pressure steam which is led to turbogenerators, reducing the steam pressure for the mill use and generating electricity. A modern kraft pulp mill is more than self-sufficient in its electrical generation and normally will provide a net flow of energy to the local electrical grid.

Pineville Mill Example

Overview

Located in central Louisiana, 220 miles from New Orleans, the Pineville mill resides on a 1200-acre site, and produces unbleached kraft linerboard, fiber can stock, and kraft roll pulp.

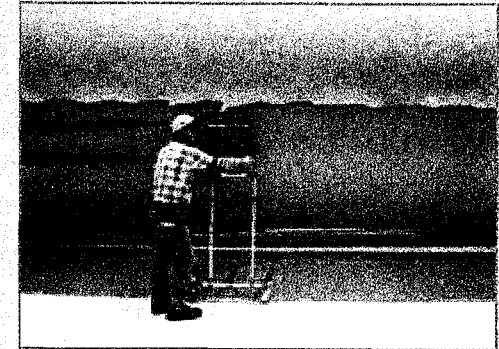
Production

Our Pineville mill is conveniently located near several major US gulf ports to ship overseas and domestically by rail and truck.

The mill uses 100% virgin southern pine-furnish. The long softwood fibers produce a linerboard with exceptional physical strength and a consistent print surface. The Pineville paper machine is 282 inches wide.

Environmental Stewardship

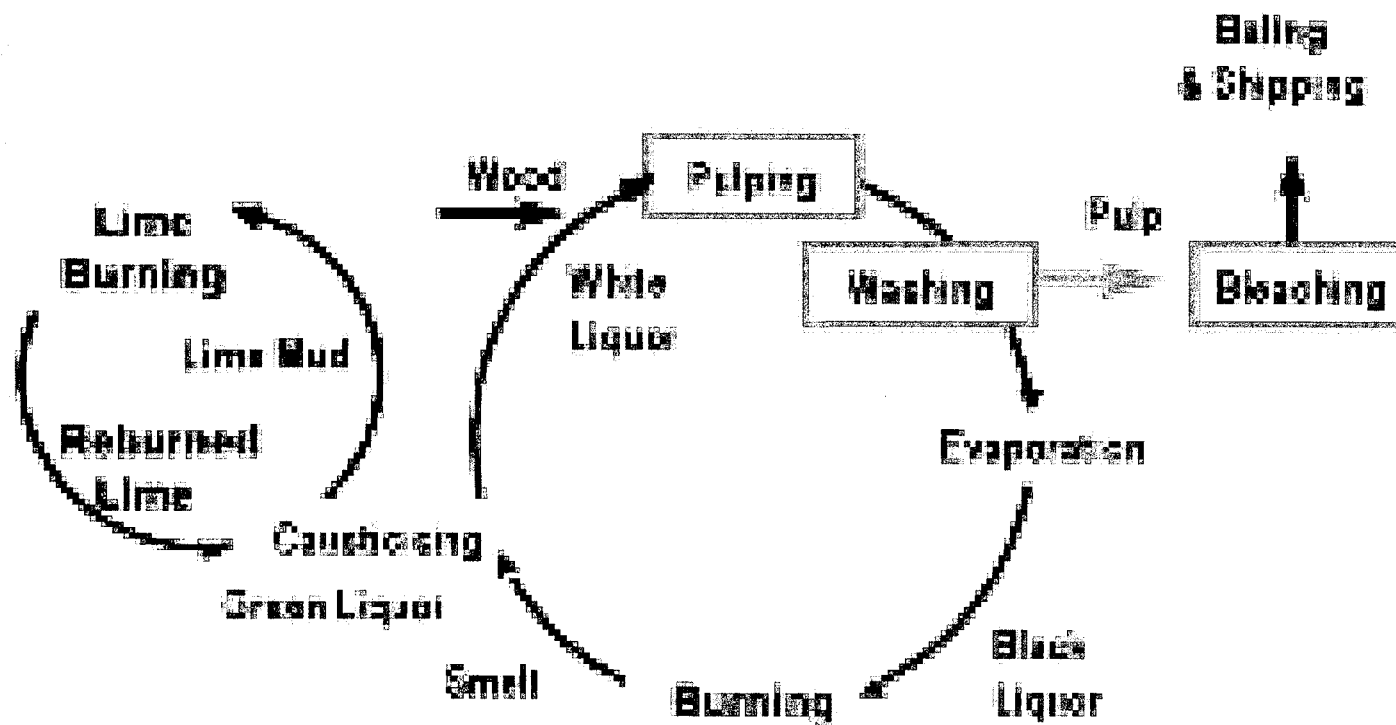
The Pineville mill is committed to balancing our business goals with conscientious stewardship of the environment.

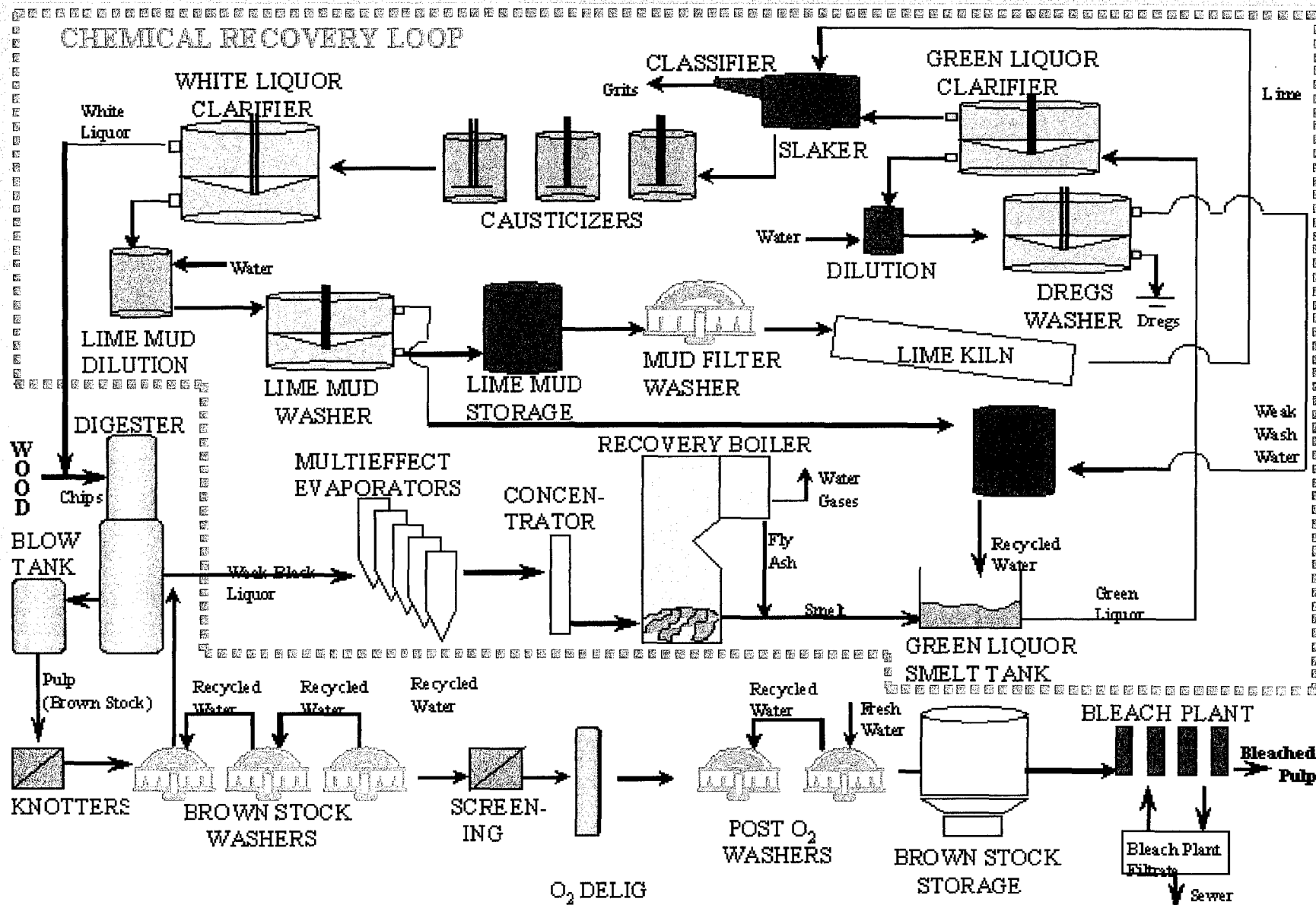


Most recently, the mill was chosen to receive one of only seven statewide Governor's Awards for Outstanding Pollution Prevention Achievement for getting approval to market wood ash as a beneficial product that returns valuable nutrients to the soil. Other similar awards have been received in recent years, including company environmental excellence awards for innovative projects to conserve valuable landfill space and to restore industrial facilities back to their natural conditions.



Simplified Kraft Liquor Cycle



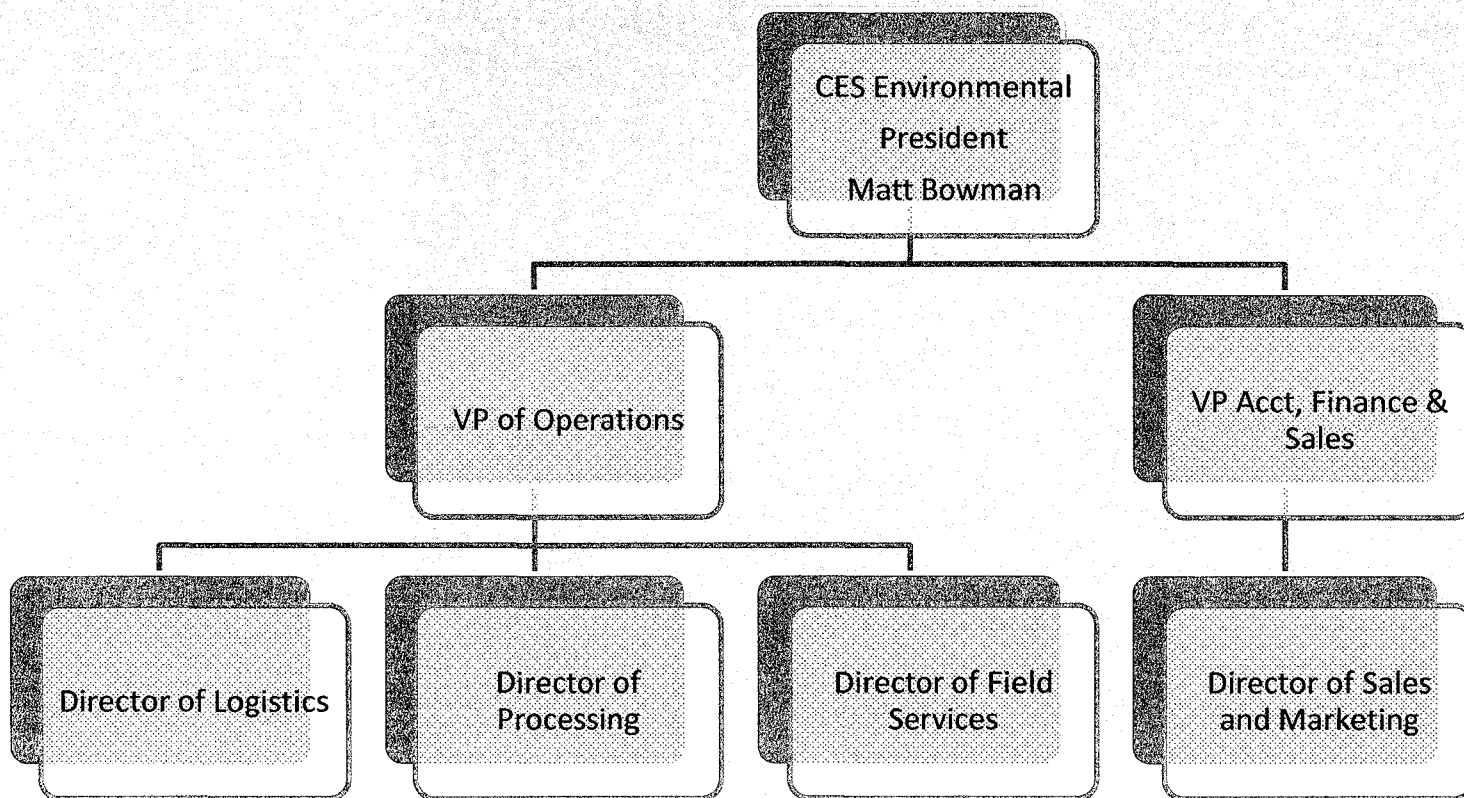


What Kraft Mills Want

- Sodium – Sodium – Sodium- The higher the concentration the better. Generally over 6% is desired. 5% sodium hydroxide content is considered a minimum.
- Sodium Sulfide – Most mills prefer caustic with low sodium sulfide content (less than 1%). However, some mills during different intervals want caustic with high sulfide content.
- Mills like caustic that is clear in color with little or no solids. They will make allowances for dark caustic, but can be sensitive to solids.

What Mills Don't Want

- Hydrocarbons – Mills are very sensitive to hydrocarbons. Hydrocarbons in their caustic tanks are a safety issue which could cause personal injury. This is the most important specification for spent caustic.
- Potassium and Chloride- Caustic should contain less than 200 ppm potassium. Chloride levels should be low. Potassium causes fouling on the reboiler. Potassium leads to unplanned shutdown of the reboiler which effectively shuts down the mill. Costs for a shutdown runs in the hundreds of thousands of dollars per occurrence.
- Solids- Visible solids are not allowed



Pulping Process

Purpose of cooking in chemical pulp production is to use chemicals and heat to remove fiber binding lignin so chips defibrate easily. Fibers containing cellulose are tried to keep as long, unbroken and strong as possible. Also wood extractives which can later cause foaming and precipitants in the process are tried to remove. Today sulfate cooking is the most commonly used pulp production method.

Chemicals which dissolve as much lignin and as little cellulose as possible are used in pulping. Sulfate process uses white liquor, a mixture of sodium hydroxide (NaOH) and sodium sulfide (Na_2S). Sodium hydroxide degradates lignin and sodium sulfide fastens cooking reactions and decreases cellulose degradation caused by sodium hydroxide. Temperature in sulfate pulping is normally 150 - 170 °C.

Pulping (Continued)

Lignin amount left in fibers is expressed with a kappa number . Lignin causes pulp to turn brown during cooking. Because bleaching chemicals are much more expensive than cooking chemicals, as much as possible of the lignin is tried to remove during the cooking process. However, too extensive lignin removal causes cellulose degradation to increase. This decreases pulp strength and yield . Today, typical kappa number for pulp to be bleached is 14 - 20 for hardwood and 20 - 30 for softwood pulp. If the pulp is not beached, the kappa number after cooking will be much higher, typically 40 - 100. Pulp yield is typically 50 - 53% for hardwood and 46 - 49% for softwood.

Controllability and smoothness of the cooking process are requirements for succeeding of the following process phases. Digester plant faults reflect to other departments and cause changes for pulp properties such as strength, brightness and beatability changes, debris and brightness reversion.

Cooking Chemicals

- **White liquor** is a chemical mixture used in sulfate pulping. The effective chemicals of it are **sodium hydroxide** (NaOH) and **sodium sulfide** (Na_2S). The concentration of those compounds in white liquor is expressed as **affecting** e.g. **active alkali** or **effective alkali** (g/l):
- **Black liquor** is white liquor which has reacted in digester and to which wood compounds have dissolved. Black color comes from lignin compounds colored by alkali and dissolved to liquor.
- Sodium hydroxide and sulfide are expressed in grams per liter of sodium hydroxide or sodium oxide (Na_2O) equivalents. Practice is based on sodium contents of the compounds. Conversion factor from Na_2O to NaOH is 1.29 and 0.775 in reverse direction.
- **Green liquor** is recovery boiler smelt dissolved to weak white liquor. In other words it is black liquor with organic incinerated. In addition other reactions have taken place, for example sodium sulfate has transformed to sodium sulfide. Green liquor is processed to white liquor in recaustizing plant.
- Sodium sulfide concentration in cooking liquor is expressed as **sulfidity** (%). Sulfidity is usually on the level 35 - 45% in modern mills. **Reduction** (%) shows how completely the nearly inert sodium sulfate has been reduced to useful sodium sulfide. Reduction takes place in recovery boiler. **Causticity** (%) shows chemical efficiency of white liquor production (causticization). It shows how much inert sodium carbonate has been transformed to useful sodium hydroxide.

Total Alkali

Due to reaction balance during white liquor production the white liquor **concentration** is approximately 140 - 170 g/l active alkali as NaOH. White liquor includes also other sodium salts, such as sodium sulfate (Na_2SO_4) and sodium carbonate (Na_2CO_3) and small amounts of sulfites and chlorides. All sodium salts can be expressed as **total alkali** (TTA, titrating alkali, g/l). All sodium compounds are taken into account, such as sodium sulfate and carbonate. Large amounts of sulfate and carbonate in white liquor indicate malfunctions in recovery boiler or recausticizing plant. Because sulfate and carbonate don't significantly participate in cooking processes, they are only unnecessary loads in chemical circulation. The white liquor contains also other substances not reacting in cooking, such as chlorides and calcium compounds. The amount of these so called inert materials depends greatly on mill chemical circulation, for example on white liquor filtration success.

Sulfidity

- Sulfidity is the molar ratio of sodium and sulfide ion. It is calculated by the following formula:

$$\%S/\%Na * 143 = \% \text{ Sulfidity}$$

Sulfidity less than 30 is considered low

Sulfidity over 100 is considered high

The maximum sulfidity of any solution is 200. As sulfidity approaches 200, care must be taken during transport and handling due to the possibility of hydrogen sulfide being present in the headspace.



RELIANCE

FOR RELIANCE TO RELY

Spent Caustic – Customer Spiel

Spent Caustics are produced from the contacting sodium hydroxide with hydrocarbons, gasses or chemical streams. The caustic is typically used to extract acidic species to meet quality specifications or emissions. Once the caustic has been used in the initial process, it still has usefulness in certain industries for the residual chemicals contained. The spent caustic when used directly as received, without reclamation, is a product and is **not** classified as a waste by the EPA. Specifically, under RCRA part 261.2(e)(1)(ii) “Materials that are not solid waste when ... Used or reused as effective substitutes for commercial products”.

Customer Spiel (Continued)

CES has partnered with several large consumers in the paper industry which utilize the spent caustic as a direct substitute for other commercially available products. Namely, sodium hydroxide, potassium hydroxide, and or sodium sulfide. For years the paper industry has utilized spent caustic as an economical alternative to pulping chemicals.

The biggest challenge has always been is to match the highly variable production volume and quality from the producers with the highly variable requirements of the consumer. CES's network of suppliers, terminals, owned and operated equipment, and consumers are instrumental in matching supplies with demand. The end result is a cost effective solution for both suppliers and consumers.

Customer Spiel (Continued)

CES owns and operates an extensive transportation and terminal infrastructure. Our current fleet consists of over 40 tractors and 70 trailers each equipped with the latest in GPS tracking and monitoring. We can safely and responsibly transport your all type of spent caustics via CES owned and operated tank trucks. By owning our own equipment, we insure that all of the drivers/operators receive are properly trained and have all the required safety certification for the transportation and safe loading and unloading of spent caustic. For shipments by other modes, we provide transport by third party rail car, barge, or ocean-going tanker.

Visit Strategy

- Each Sales person get with G Lenertz and R Tafilaj to assign priority for assigned accounts. If RRT is not available, G Lenertz will cover.
- For refineries with contacts in place, call contact, skip to number 2 below.
- If no contact, ask reception personal:
 1. Does the site generate caustic /other? If so, who has the responsibility. Generally this will be in order of likelihood: Unit engineer, procurement, environmental, movements.
 2. Relate spiel of previous pages. Stress reliable non waste handling of caustic. All modes of transportation available.
 3. Ask for meeting. If not accepted, provide follow up email that summarizes services.

Pricing

Pricing is determined by overall quality and concentration of the spent caustics various constituents, the transportation modes, and overall quantity. The pricing of each caustic usually starts with getting a sample. Samples should be analyzed for the following:

- Caustic concentration
- Sulfide concentration
- Solids content
- Visual
- CES will gladly analyze and price each sample free of any obligation to ship. A one pint sample is sufficient.



FORM OF TENDER

RasGas Company Limited
PO Box 24200
Doha, State of Qatar

Attention: LTC Secretary

REF: Invitation To Tender Number: ITT/RG08/L240/08

ITT Title: Long Term Sulfidic Caustic Solution Removal,
Transportation & Handling Services

Dear Sirs,

We refer to your Invitation To Tender and having carefully examined the documents therein, hereby offer to provide the Work in conformity with these documents, including the following Tender Addenda issued during the tender period (*list each Tender Addendum number and date*);

for the rates and prices detailed in our tender response for PART B Section 4.0 and in accordance with our other tender responses submitted as required by the Invitation To Tender package.

We agree to abide by this tender (and all our attached submissions) for the period stipulated under "Tender Validity" in the Attachment to PART A Section 1.0 of the Invitation To Tender package (or such period as may be required under a Tender Addendum).

Yours faithfully,

For: CES Environmental Services, Inc.

Name: Ramiz Tafilaj

Signature: 

Position: Vice President - International Business

Date: 12-4-09



FORM OF TENDER BOND

1. The undersigned (1)
(hereinafter referred to as the "Guarantor"), established at (2)
.....represented by (3)
....., have taken notice of the tender ref. (4) ITT/RG08/L240/08
(hereinafter referred to as the "Tender") submitted by (5)
..... (hereinafter referred
to as the "Tenderer"), whose registered office is at (6)
.....
to RasGas Company Limited (hereinafter referred to as the "Company"), a company
registered under the laws of the State of Qatar, with its registered office at Post Office
Box 24200, Doha, State of Qatar.
2. The Guarantor hereby guarantees the enforceability of the Tender Bond in accordance
with the terms hereunder
3. If the Tenderer fails to comply with any of its obligations under the Tender
documents, or if the Tenderer withdraws the Tender within the period of validity of the
Tender, or if the Tenderer fails after receipt from the Company of Notice of Award
to enter into a Contract with the Company, then the Guarantor hereby irrevocably
undertakes on behalf of the Tenderer to pay to the Company on first demand any
sum or sums not exceeding (7)
..... (To be Advised). \$ 200,000
4. Each demand by the Company for payment under this guarantee shall be made in
writing to the following address:

(8)

The Guarantor shall promptly notify the Company of any changes in the above address.
5. Each demand under paragraph 4 above shall indicate the breach of the Tenderer's
obligations as notified to the Tenderer by the Company.
6. The Guarantor shall make payment hereunder on first demand without restriction or
conditions and notwithstanding any objection by the Tenderer. The Guarantor shall not
require the Company to justify the breach indicated in its demand for payment, nor shall
the Guarantor have any recourse against the Company in respect of any payment made
hereunder.
7. No alteration in the terms of the Tender made by agreement between the Tenderer and
the Company shall in any way release the Guarantor from all or any part of its liabilities
under this guarantee.
8. The Guarantor shall pay the sum of this tender bond on demand by the Company
hereunder within fifteen (15) calendar days after the date of receipt of the Company's
demand.
9. This guarantee shall remain valid until (9) and
in the event that the Tenderer is notified of the award of the Contract to it by the
Company this guarantee shall in addition be valid until signature of the Contract by the
Tenderer and the Company. If the Tendering/ Contract conditions call for the provision of
a Performance Bond then the successful Tender shall ensure that their Tender Bond and
Tender Validity remains valid until submission and acceptance by RasGas of a fully
compliant Performance Bond.



10. Terms in capital letters shall have the meaning ascribed to them in the Invitation To Tender documents.
11. This guarantee shall be interpreted in accordance with the laws of the State of Qatar and any proceedings for enforcement shall be brought before the competent court of the State of Qatar.
12. The Guarantor represents that this guarantee has been established in such form and with such content that it is fully and freely enforceable against the Guarantor in the manner provided in paragraph 11 above.

(Date)

[Common Seal of Signature of Guarantor or such other formality as may be required under the law to render a unilateral promise binding on the Guarantor]

- (1) - **Name of the Bank**
- (2) - **Address of the Bank**
- (3) - **Guarantor officer's name and position**
- (4) - **Invitation To Tender number**
- (5) - **The name of the Tenderer**
- (6) - **Address of the office of the Tenderer**
- (7) - **The amount of the Tender Bond as stipulated in PART A Section 1.0 of the Invitation To Tender package**
- (8) - **The Bank address for notices**
- (9) - **Date corresponding to the tender validity as stipulated in PART A Section 1.0 Attachment 1/3 of the Invitation To Tender package plus fifteen (15) calendar days**

For Bank of America Use Only
L/C No.

A. Application.

1 CES Environmental Services, Inc. ("Applicant") requests Bank of America to issue an irrevocable standby letter of credit ("Letter of Credit") as follows:

☒ Full text teletransmission ☐ Airmail with brief preliminary teletransmission advice ☐ Airmail ☐ Courier

2. Applicant Address: 3. For Account of (Name and address, if different from Applicant):

4904 Griggs Rd _____

Houston TX _____

77021 _____

_____ _____

_____ _____

4. Advising Bank: 5. In favor of (Beneficiary Name and Address):

_____ Doha Bank

_____ _____

_____ Doha, State of Qatar

_____ _____

_____ _____

6. Amount: Two Hundred Thousand United States Dollars (\$200,000.00)

(in words and figures)

Currency US Dollar (if left blank, U.S. Dollars)

Expiration Date. Drafts to be drawn on and presented at Bank of America's Address set forth in the Letter of Credit on or before: 05/15/2009

☐ If this box is marked, Applicant authorizes Bank of America to effect payment of any sums due under this Application and Agreement by means of debiting Applicant's account with Bank of America set forth below. This authorization does not effect the obligation of Applicant to pay such sums when due, if there are insufficient funds in such account to make such payment when due, or if Bank of America fails to debit the account, and this authorization does not affect any setoff rights of Bank of America at law or in equity.

Applicant's account number _____

with Bank of America 005772224533

7. Available by drafts drawn at sight on Bank of America when accompanied by the following documentation:

a. The original Letter of Credit.

b. The signed statement of the Beneficiary worded as follows (state wording that is to appear in the statement accompanying the draft; specify if such wording must be exact):

8. Special Instructions: **Please contact one of the following upon perfection of the LC: Matt Bowman (713-826-1329), Greg Bowman (713-419-6076) or Ramiz Tafilaj (281-300-5322). Ramiz Tafilaj will pickup Tender Bond at Doha Bank upon notification.**

B. Agreement.

In consideration of Bank of America's issuing the Letter of Credit at the request of Applicant, Applicant agrees to the following:

1. Applicant Payments.

(a) Applicant shall pay Bank of America, on demand, all amounts paid by Bank of America under or in respect of the Letter of Credit.

(b) On each fee payment date, so long as any undrawn amount of the Letter of Credit remains available, Applicant shall pay Bank of America a Letter of Credit fee. The fee payment date(s) shall be the date(s) as Applicant and Bank of America may agree, or in the absence of such agreement, the fee payment date shall be the date on which Bank of America issues the Letter of Credit. The fee shall be at such rate per annum as Applicant and Bank of America may agree or, in the absence of such agreement, at the rate customarily charged by Bank of America at the time such fee is payable, based upon Applicant's creditworthiness, as determined by Bank of America in its sole discretion. The applicable Letter of Credit fee shall be calculated and payable on the undrawn amount of the Letter of Credit as of each fee payment date, and shall be for the period commencing on such fee payment date and ending on the day preceding the next fee payment date (or the expiration date of the Letter of Credit, as the case may be), both dates inclusive. The Letter of Credit fee will be computed on the basis of a 360-day year and actual days elapsed. Bank of America shall not be required to refund any portion of the Letter of Credit fee paid for any period during which (a) the Letter of Credit expires or otherwise terminates or (b) the undrawn amount of the Letter of Credit is reduced by drawings or by amendment.

(c) Applicant shall pay Bank of America, on demand, commissions and fees for amendments to, payments under, extensions of or cancellation of the Letter of Credit, and other services in the amounts Applicant and Bank of America may agree or, in the absence of such agreement, in the amounts customarily charged by Bank of America on the date of Bank of America's demand.

(d) All payments and deposits of any kind by Applicant under this Application and Agreement, including prepayments, shall be made at the banking center or office Bank of America may designate from time to time. Bank of America shall have no obligation to pay Applicant interest on any such payment, prepayment or deposit made by Applicant under this Application and Agreement.

(e) (i) All payments and deposits by Applicant under this Application and Agreement shall be in the currency in which the Letter of Credit is payable, except that Bank of America may, at its option, require payments and deposits by Applicant under this Application and Agreement to be made in U.S. Dollars if the Letter of Credit is payable in a foreign currency.

(ii) The amount of each payment and each deposit by Applicant under this Application and Agreement in U.S. Dollars for a Letter of Credit payable in a foreign currency shall be determined by converting the relevant amount to U.S. Dollars at the Conversion Rate in effect:

(A) with respect to each payment under Section 1(a) of this Agreement, on the date the payment is made by Bank of America under or in respect of the Letter of Credit; and

(B) with respect to each payment not falling under the preceding clause (A) and each deposit, on the date of Bank of America's demand for such payment or deposit.

(iii) If a U.S. Dollar deposit by Applicant under this Application and Agreement for a Letter of Credit payable in a foreign currency becomes less than the U.S. Dollar equivalent of the undrawn amount of the Letter of Credit because of any variation in rates of exchange, Applicant shall deposit with Bank of America, on demand, additional amounts in U.S. Dollars so that the total amount deposited by Applicant under this Application and Agreement is not less than the U.S. Dollar equivalent of the undrawn amount of the Letter of Credit, determined by using the Conversion Rate on the date of Bank of America's latest demand.

(iv) "Conversion Rate" means the rate quoted by Bank of America for the purchase from Bank of America of the relevant foreign currency with U.S. Dollars.

(f) Applicant shall reimburse or compensate Bank of America, on demand, for all costs incurred, losses suffered and payments made by Bank of America which are applied or allocated by Bank of America to the Letter of Credit (as determined by Bank of America) by reason of any and all present or future reserve, capital, deposit, assessment or similar requirements against (or against any class of or change in or in the amount of) assets or liabilities of, or commitments or extensions of credit by, Bank of America.

(g) Applicant shall pay interest, on demand, on any amount not paid when due under this Application and Agreement from the due date until payment in full at a rate per annum equal to the rate of interest publicly announced from time to time by Bank of America as its prime rate, plus three percentage points (not to exceed the maximum rate permitted by applicable law). The prime rate is set by Bank of America based on various factors, including Bank of America's costs and desired return, general economic conditions and other factors, and is used as a reference point for pricing some credits. Bank of America may price credit at, above or below the prime rate. Any change in Bank of America's prime rate shall take effect at the opening of business on the day specified in Bank of America's public announcement of a change in Bank of America's prime rate. Interest will be computed on the basis of a 360-day year and actual days elapsed.

2. Deposit Events. Upon the occurrence of any of the following events, Applicant shall deposit with Bank of America, on demand (except that such demand shall not be required in the event of an occurrence described in (b) below) and as cash security for Applicant's obligations to Bank of America under this Application and Agreement, an amount equal to the undrawn amount of the Letter of Credit:

(a) Applicant defaults under any provision of this Application and Agreement;

(b) Any bankruptcy or similar proceeding is commenced with respect to Applicant;

(c) Any default occurs under any other agreement involving the borrowing of money or the extension of credit under which Applicant may be obligated as borrower, installment purchaser or guarantor, if such default consists of the failure to pay any indebtedness when due or if such default permits or causes the acceleration of any indebtedness or the termination of any commitment to lend or to extend credit;

(d) Applicant or any of its affiliates defaults on any other obligation to Bank of America;

(e) In the opinion of Bank of America, any material adverse change occurs in Applicant's business, operations, financial condition or ability to perform its obligations under this Application and Agreement;

(f) Any guarantee of Applicant's obligations under this Application and Agreement terminates, is revoked or its validity is contested by the guarantor, or any of the events set forth in (b) through (e) above occur with respect to the guarantor rather than the Applicant; or

(g) Any court order, injunction or other legal process is issued restraining or seeking to restrain drawing or payment under the Letter of Credit.

3. Charge to Accounts. If Bank of America is unable to debit the account, if any, specified on the Application, Applicant authorizes Bank of America to charge any of Applicant's accounts with Bank of America, or any affiliate of Bank of America, for all amounts then due and payable to Bank of America under this Application and Agreement.

4. Indemnities.

(a) Applicant will indemnify and hold Bank of America (such term to include for purposes of this Section 4 affiliates of Bank of America and its affiliates' officers, directors, employees and agents) harmless from and against (i) all loss or damage arising out of the issuance by Bank of America, or any other action taken by any such indemnified party in connection with the Letter of Credit including any loss or damage arising in whole or in part from the negligence of the party seeking indemnification, but excluding any loss or damage resulting from the gross negligence or willful misconduct of the party seeking indemnification, and (ii) all costs and expenses (including reasonable attorneys' fees and allocated costs of in-house counsel and legal expenses) of all claims or legal proceedings arising out of the issuance by Bank of America of the Letter of Credit or incident to the collection of amounts owed by Applicant hereunder or the enforcement of the rights of Bank of America hereunder, including, without limitation, legal proceedings related to any court order, injunction, or other process or decree restraining or seeking to restrain Bank of America from paying any amount under the Letter of Credit. Additionally, Applicant will indemnify and hold Bank of America harmless from and against all claims, losses, damages, suits, costs or expenses (including reasonable attorneys' fees and allocated costs of in-house

counsel, and legal expenses) arising out of Applicant's failure to timely procure licenses, comply with applicable laws, regulations or rules, or any other conduct or failure of Applicant relating to or affecting the Letter of Credit.

(b) If any award, judgment or order is given or made for the payment of any amount due under this Application and Agreement and such award, judgment or order is expressed in a currency other than the currency required under this Application and Agreement, Applicant shall indemnify Bank of America against and hold Bank of America harmless from all loss and damage incurred by Bank of America as a result of any variation in the exchange between the date of such award, judgment or order and the date of payment (in the case of partial payments, the date of each partial payment thereof) in the required currency.

(c) Each of these indemnities shall constitute an obligation separate and independent from the other obligations contained in this Application and Agreement, shall give rise to a separate and independent cause of action, shall apply irrespective of any indulgence granted by Bank of America from time to time, and shall continue in full force and effect notwithstanding any award, judgment or order for a liquidated sum in respect of an award due under this Application and Agreement.

5. Governing Law and Rules.

(a) The Letter of Credit will be subject to and governed by the most current version of the effect on the date the Letter of Credit is issued, of the International Chamber of Commerce publication "International Standby Practices", except as Applicant may otherwise instruct the Application and as Bank of America may otherwise agree within the text of the Letter of Credit as issued. The Letter of Credit will also be subject to, and this Application and Agreement will be governed by, the laws of the state in the United States where Bank of America issues the Letter of Credit; provided, however, that, with respect to the Letter of Credit, Bank of America may agree, on Applicant's request, to specify in the Letter of Credit, a different state's laws as the governing law. In any event, each choice of law shall be without reference to the chosen state's provisions regarding conflicts of laws.

(b) Applicant and Bank of America agree, to the extent permitted under applicable law, to waive any right to a trial by jury in any action or proceeding with respect to an action or proceeding will be tried before a judge without a jury.

6. Applicant Status. The word "Applicant" in this Application and Agreement refers to each signer (other than Bank of America) of this Application and Agreement. If this Application and Agreement is signed by more than one Applicant, their obligations under this Application and Agreement shall be joint and several.

7. Representations and Warranties. Applicant represents and warrants to Bank of America that it has the authority to enter into this Application and Agreement and that the Agreement will not violate or conflict with any of the provisions of its constituent documents or any other agreement or undertaking to which it is a party or to which it is bound.

8. Miscellaneous.

(a) No delay, extension of time, renewal, compromise or other indulgence which occurs or is granted by Bank of America shall impair the rights and powers of Bank of America hereunder. Bank of America shall not be deemed to have waived any of its rights hereunder, unless Bank of America shall have signed such waiver in writing.

(b) Any notice from Bank of America to Applicant shall be deemed given when mailed, postage paid, or when delivered to a courier, fee paid by shipper, addressed to Applicant at the address furnished by Applicant to Bank of America pursuant to this Application, or when confirmed by electronic confirmation to Bank of America as have been delivered via facsimile or other teletransmission. Any notice from Applicant to Bank of America shall be effective upon receipt by Bank of America.

(c) Each provision of this Application and Agreement shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Application and Agreement shall be prohibited by or invalid under applicable law, such provision shall be ineffective only to the extent of such prohibition or invalidity, without invalidating the remainder of such provision or the remaining provisions of this Application and Agreement.

(d) Any and all payments made to Bank of America hereunder shall be made free and clear of and without deduction for any present or future taxes, levies, imposts, deductive charges or withholdings, and all liabilities with respect thereto, excluding income or franchise taxes imposed by the United States and any political subdivisions thereof (such as nonexcluded taxes being herein called "Taxes"). If Applicant shall be required by law to deduct any Taxes from or in respect of any sum payable hereunder, (i) the sum payable shall be increased as may be necessary so that after making all required deductions (including deductions applicable to additional sums payable under this Section 8(d)), Bank of America shall receive an amount equal to the sum Bank of America would have received had no deductions been made, (ii) Applicant shall make such deductions, and (iii) Applicant shall pay the full amount deducted to the relevant authority in accordance with applicable law. Applicant will indemnify Bank of America for the full amount of Taxes (including, without limitation, any Taxes imposed by any jurisdiction on amounts payable under this Section 8(d)) paid by Bank of America and any liability (including penalties, interest and expenses arising therefrom or with respect thereto, whether or not such Taxes were correctly or lawfully asserted). This indemnification shall be made within 30 days from the date Bank of America makes written demand therefor. Within 30 days after the date of any payment of Taxes, Applicant will furnish to Bank of America the original or a certified copy of a receipt evidencing payment thereof.

(e) This Application and Agreement shall be binding upon Applicant, its successors and assigns, and shall inure to the benefit of Bank of America, its successors, transferees and assigns; provided that any assignment by Applicant of any of its rights or obligations under this Application and Agreement without the prior written consent of Bank of America shall be void.

(f) Unless the Applicant has specified in the Application that the wording of the Letter of Credit must be exact, Applicant understands that the final form of the Letter of Credit may vary from the wording specified in the Application, and Applicant authorizes Bank of America to make such changes, not materially inconsistent with the Application, which Bank of America deems necessary or appropriate. Applicant understands that the risk to Applicant is greater if Applicant requests a standby letter of credit which requires only a draft, rather than a standby letter of credit which requires supporting documentation.

(g) In the event of any change or modification, with the consent of Applicant, which consent may be given by any means of submission acceptable to Bank of America, including, without limitation, computer, facsimile or telex, relative to the Letter of Credit or any instrument called for hereunder, including any waiver made or in good faith believed by Bank of America to have been made by Applicant of any term hereof or the noncompliance of any such instruments with the terms of the Letter of Credit, this Application and Agreement shall be binding upon Applicant with regard to the Letter of Credit as so changed or modified, and to any action taken by Bank of America or any of its correspondents relative thereto. No term or provision of this Application and Agreement can be changed orally, but only in a writing and signed by Applicant and Bank of America.

(h) Bank of America assumes no liability or responsibility for the consequences arising out of delay and/or loss in transit of any message, letter or documentation, or for delay, mutilation or other error arising in the transmission of any teletransmission. In no event shall Bank of America be liable for any special, indirect, consequential or exemplary damages.

(i) If Applicant includes in the Application any language describing events or conditions that would not be possible for Bank of America to verify solely from the documents required to be presented under the Letter of Credit, Applicant acknowledges and agrees that Bank of America has no obligation to verify compliance with such requirements.

NOTICE OF FINAL AGREEMENT. THIS WRITTEN AGREEMENT REPRESENTS THE FINAL AGREEMENT BETWEEN THE PARTIES AND MAY NOT BE CONTRADICTED BY EVIDENCE OF PRIOR, CONTEMPORANEOUS OR SUBSEQUENT ORAL AGREEMENTS OF THE PARTIES. THERE ARE NO UNWRITTEN ORAL AGREEMENTS BETWEEN THE PARTIES.

This Application and Agreement is executed by Applicant on 1/26/09

EPAHO120001675

Name of Applicant	
CES Environmental Services, Inc	
By:	Title
Greg Bowman	VP Finance and Admin
Name of Applicant (if any, co-signing with the Applicant above)	
Matt Bowman	
By:	Title
Matt Bowman	President
(WHERE SPECIMEN SIGNATURES OF THE APPLICANT NAMED ABOVE ARE NOT ON FILE WITH BANK OF AMERICA, THE FOLOWING SIGNATURE VERIFICATION IS REQUIRED.)	
The above signature of an officer, partner or agent of each Applicant indicated above confirms to that on file with us and such officer, partner or agent is fully authorized to sign this Agreement for such Applicant.	
By:	BANK (Full Name)
	(Bank Address)
Authorized Signature/Title (Specimen signature of the signer must be on file with Bank of America)	
00-35-0521NSBW 05-2007	

FOR OFFICE USE ONLY			
<input type="checkbox"/> Trade Operations		Mail Code#	
COMMISSION	<input type="checkbox"/> Per Standard Fee Schedule	<input type="checkbox"/> Other	<input type="checkbox"/> Charge Banking
	<input type="checkbox"/> Charge Directly	<input type="checkbox"/> Commissions and Charges only	<input type="checkbox"/> Drawings, Commissions and Cl
APPROVING OFFICER (Printed Name)		PHONE #	
OFFICER TELEPHONE #		FAX #	
DDA APPLICANT A/C #			
APPROVING BANK OFFICER SIGNATURE			
OFFICER - INTEROFFICE ADDRESS			
OFFICER NUMBER AND COST CENTER NUMBER			

Bank of Americ

**THIS FORM MAY BE USED TO ADD NEW, ADDITIONAL ACCOUNTS TO EXISTING DEPOSIT ACCOUNT DOCUMENTATION
WITH THE SAME DESIGNATED ACCOUNT SIGNERS, LEGAL ENTITIES AND EIN ID.
THIS FORM MAY NOT BE USED TO OPEN ACCOUNTS FOR DIFFERENT LEGAL ENTITIES.**

Date: 01/26/09

Establish additional account(s) as indicated below using the Deposit Account Documentation of:

01/27/1999

CES Environmental Services Inc.

Date of Original Deposit Account Documentation

Organization Legal Name

Reference Account Number:

Employer Identification Number of Reference Account Number:

$$\begin{array}{r} 3 \\ \hline 76 \end{array} \cdot \underline{0592985}$$
[illegible]

By signing below, this organization hereby adopts the Agreement, Certification of Tax Identification and Authorizations contained in the deposit account documentation used to establish its accounts with us. Further, any person signing this Agreement for the Organization certifies that they are duly authorized to do so as evidenced by existing banking resolutions/contract for deposit of moneys (CA Public Funds only) on file with us.

By:

Greg Bowman VP Finance
Type or Print Name/Title of Authorized Signer

Type or Print Name/Title of Authorized Signer

Signature

THIS DOCUMENT MUST BE PROCESSED BY THE BANK OF AMERICA UNIT LISTED BELOW

For Bank Use:

Forward to:

Date Received:

Received by:

Phone:

Date Reviewed:

Reviewed by:



Assignment of Deposit Account for a Cash Secured Letter of Credit

Letter of Credit Applicant Legal Name CES Environmental Services Inc	Letter of Credit Requested Amount \$ 200,000.00
Letter of Credit Beneficiary Name	Letter of Credit Application Date 01/27/2009

The undersigned Grantor (jointly and severally if more than one) hereby assigns, pledges and grants a security interest to Bank of America, N.A. (the "Bank") in all right, title and interest of the Undersigned in and to the deposit account maintained by the Undersigned with the Bank and described as follows:

Bank of America Deposit Account Number: 9100012373340928			
Account Type:	<input checked="" type="checkbox"/> Certificate of Deposit	<input type="checkbox"/> Time Deposit	<input type="checkbox"/> Savings Deposit

together with all interest and other income earned thereon, all additions thereto and renewals, substitutions or replacements thereof (collectively hereinafter, the "Account" as security and collateral for (a) the prompt payment of all indebtedness, liabilities and obligations of the Undersigned to the Bank of every kind and nature whatsoever, including, without limitation, the reimbursement obligation of the above referenced Letter of Credit Applicant arising under the Application and Agreement for the above described Letter of Credit as may be modified, amended or renewed from time to time, and such other indebtedness, liabilities and obligations to the Bank which are direct, indirect, contingent, primary, secondary, alone, jointly with others, due, to become due, future advances, now existing, hereafter created, principal, interest, expense payments, liquidation costs, and attorney's fees and expenses (collectively, the "Obligations"); and (b) the performance of all of the terms, conditions and provisions of any note, security agreement, pledge agreement, guaranty agreement, mortgage, deed of trust, loan agreement, hypothecation agreement, indemnity agreement, letter of credit application and agreement, assignment, or any other document previously, simultaneously or hereafter executed and delivered by the Undersigned and/or any other party, singly or jointly with another party or parties, evidencing, securing, guarantying or in connection with any of the Obligations (collectively, the "Loan Documents").

The Undersigned hereby consents that at any time and from time to time and with or without consideration, the Bank may, without notice to or further consent of the Undersigned and without in any manner affecting, impairing, lessening or releasing this Assignment of Deposit (this "Assignment"), renew, extend, change the manner, time, place and terms of payment of, sell, exchange, release, surrender, realize upon, modify, waive, grant indulgences with respect to and otherwise deal with in any manner: (a) all or any part of the Obligations; (b) any of the Loan Documents; (c) all or any part of any property at any time securing all or any part of the Obligations; and (d) any party (including, without limitation, the Undersigned), at any time primarily or secondarily liable for all or any part of the Obligations.

In the event any of the Obligations are not paid when and as due and payable (whether by acceleration, declaration, extension or otherwise) or upon occurrence of a default under any of the Loan Documents, or upon the maturity of such Account, if such Account consists in whole or in part of a time deposit, the Bank may and is hereby irrevocably authorized to withdraw any and all funds and moneys now or hereafter on deposit to the Account at such times and in such amounts as the Bank in its sole discretion shall determine. Bank may in its discretion either (i) hold such funds or any portion thereof subject to the terms hereof, or (ii) apply such funds or any portion thereof to the Obligations in such order and manner as the Bank may elect. The Bank may at any time or from time to time take any and all actions with respect to the Account (and the funds and moneys or portions thereof deposited thereto) as authorized herein, by law and by the terms of any of the Loan Documents.

IN WITNESS WHEREOF, and intending to create an instrument executed under seal, the Undersigned has duly executed this Assignment under seal as of the 28th day of Jan, 20 09.

Grantor: CES Environmental Services Inc

By: [Signature] VP Finance & Administration

Tradeline CIF ID	LC Instrument #	Deposit Account Balance	Deposit Account Maturity Date
References in shaded area are for Bank's use only and do not limit the applicability of this document to any particular loan or item.			

**Certificate of Corporate Resolutions for a
Cash Secured Letter of Credit**

Letter of Credit Applicant Legal Name CES Environmental Services Inc	Letter of Credit Requested Amount \$ 200,000.00
Letter of Credit Beneficiary Name	Letter of Credit Application Date 01/27/2009

Resolutions of the Board of Directors of

(Name of Company) **CES Environmental Services Inc**


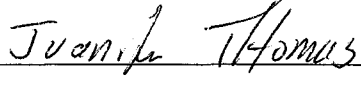

(Address of Company) **4904 Griggs Rd**

Houston Tx 77021

(hereinafter "Company")

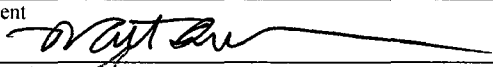
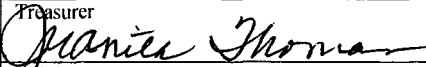
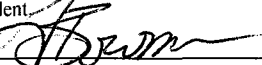
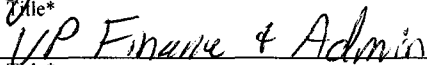
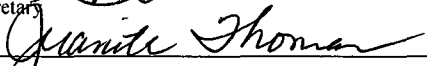
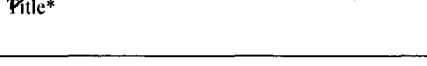
I certify that I am the keeper of the records and minutes of meetings of the Board of Directors of Company, a corporation chartered under the laws of the State of Texas, whose correct corporate name and address are stated above, and that on Jan 28th, 2008, a meeting of the Board of Directors of Company was held in accordance with law and the by-laws of Company, that a quorum of directors was present, (or, if the date was not completed above pursuant to a written consent signed by all members of the Board of Directors), the following resolutions were duly and legally passed and have not been revoked, altered or amended:

"Resolved, that Company is authorized to: (a) execute an Application for the above referenced Letter of Credit to be issued by Bank of America, N.A. ("Bank") thereby obligating the Company to reimburse Bank for any draws made under any such letters of credit issued by Bank (the "Obligations"); and/or, (b) in connection with the Application for the above referenced Letter of Credit, to make and execute such security agreements, pledge agreements, assignments and any other document securing payment of the Obligations; and that any 1 of the following persons are authorized to act in the name and behalf of Company in connection with any manners under this Resolution."

Names of Authorized People	
	
	

"Resolved that the authority herein given to all of said persons shall remain irrevocable as far as Bank is concerned until Bank is notified in writing of the revocation of such authority; and shall have acknowledged in writing receipt of such notification."

I further certify that the signatures below are the signatures of the designated officers of Company and of the persons authorized to apply for letters of credit and/or to pledge deposits by the foregoing resolutions:

Signature/Titles of Authorized People	
President 	Treasurer 
Vice President 	Title* 
Secretary 	Title* 

*Complete "Title" as "Authorized Signer" if no other title.

In Witness Whereof, I have set my hand as Secretary of Company, this 28th day of Jan, 2009.

(Corporate Seal) 
Secretary

Attachment—"C"
RASGAS
TENDER RESPONSE REQUIREMENTS
(SULPHIDIC CAUSTIC)

1. Will your company's use of this material be considered beneficial reuse and not disposal?
Yes
2. Documentation is attached demonstrating that under the environmental laws and regulations that are applicable to your company, that this material is not a waste.
Yes
3. Does your company subscribe to a set of governing principles regarding environmental stewardship, such as the Responsible Care program?
Yes

If "Yes", attach a copy.

CES Environmental Services, Inc. strictly adheres to Title 40 of the Code of Federal Regulations (parts 260-265 and 266-299) and to Title 30 of the Texas Administrative Code on Environmental Quality. Both documents can be found online. Further, CES has a number of large customers that insist on environmentally friendly practices and require audits on a regular basis.

4. How long has your company been in business? **11 Years.**
5. How long has your company been handling this type of material? **8 Years.**
6. Does your company provide technical support for this product?
Yes

If "Yes", please attach detailed description of the technical support.

CES Environmental Services, Inc. employs a Research and Development Manager whose specialty is phenolics, cresylic acids, and related products (see attached resume). CES also employs a Chemical Engineer who provides technical support (see attached resume). Finally, the Product Sales Manager has fifteen years experience in the caustic business and created the attached powerpoint for product sales training.

7. Does your Company have an environmental audit program?
Yes

If "Yes", attach a copy.

Attached

8. Does your Company have more than one outlet for this material?

Yes

If "Yes", please describe them.

Wastewater neutralization, pulp and paper processing, specific gravity modification, caustic scrubbing (as a substitute for fresh caustic), and uses in the mining industry.

9. How many other companies supply you with a similar product?

21 companies including most major oil and gas companies.



FORM OF TENDER

RasGas Company Limited
PO Box 24200
Doha, State of Qatar

Attention: LTC Secretary

REF: Invitation To Tender Number: ITT/RG08/L240/08

ITT Title: Long Term Sulfidic Caustic Solution Removal,
Transportation & Handling Services

Dear Sirs,

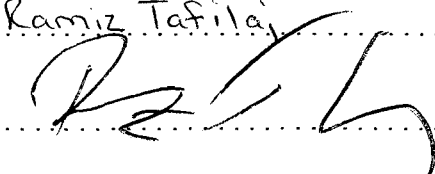
We refer to your Invitation To Tender and having carefully examined the documents therein, hereby offer to provide the Work in conformity with these documents, including the following Tender Addenda issued during the tender period (*list each Tender Addendum number and date*);

for the rates and prices detailed in our tender response for PART B Section 4.0 and in accordance with our other tender responses submitted as required by the Invitation To Tender package.

We agree to abide by this tender (and all our attached submissions) for the period stipulated under "Tender Validity" in the Attachment to PART A Section 1.0 of the Invitation To Tender package (or such period as may be required under a Tender Addendum).

Yours faithfully,

For: CES Environmental Services, Inc.

Name: Ramiz Tafilaj


Signature:


Position: Vice President - International Business

Date: 12-4-09



FORM OF TENDER BOND

1. The undersigned (1)
(hereinafter referred to as the "Guarantor"), established at (2)
..... represented by (3)
....., have taken notice of the tender ref. (4) ITT/RG08/L240/08
(hereinafter referred to as the "Tender") submitted by (5)
..... (hereinafter referred
to as the "Tenderer"), whose registered office is at (6)
.....
to RasGas Company Limited (hereinafter referred to as the "Company"), a company
registered under the laws of the State of Qatar, with its registered office at Post Office
Box 24200, Doha, State of Qatar.
2. The Guarantor hereby guarantees the enforceability of the Tender Bond in accordance
with the terms hereunder
3. If the Tenderer fails to comply with any of its obligations under the Tender
documents, or if the Tenderer withdraws the Tender within the period of validity of the
Tender, or if the Tenderer fails after receipt from the Company of Notice of Award
to enter into a Contract with the Company, then the Guarantor hereby irrevocably
undertakes on behalf of the Tenderer to pay to the Company on first demand any
sum or sums not exceeding (7)
..... (To be Advised).
4. Each demand by the Company for payment under this guarantee shall be made in
writing to the following address:

(8)

The Guarantor shall promptly notify the Company of any changes in the above address.
5. Each demand under paragraph 4 above shall indicate the breach of the Tenderer's
obligations as notified to the Tenderer by the Company.
6. The Guarantor shall make payment hereunder on first demand without restriction or
conditions and notwithstanding any objection by the Tenderer. The Guarantor shall not
require the Company to justify the breach indicated in its demand for payment, nor shall
the Guarantor have any recourse against the Company in respect of any payment made
hereunder.
7. No alteration in the terms of the Tender made by agreement between the Tenderer and
the Company shall in any way release the Guarantor from all or any part of its liabilities
under this guarantee.
8. The Guarantor shall pay the sum of this tender bond on demand by the Company
hereunder within fifteen (15) calendar days after the date of receipt of the Company's
demand.
9. This guarantee shall remain valid until (9) and
in the event that the Tenderer is notified of the award of the Contract to it by the
Company this guarantee shall in addition be valid until signature of the Contract by the
Tenderer and the Company. If the Tendering/ Contract conditions call for the provision of
a Performance Bond then the successful Tender shall ensure that their Tender Bond and
Tender Validity remains valid until submission and acceptance by RasGas of a fully
compliant Performance Bond.



10. Terms in capital letters shall have the meaning ascribed to them in the Invitation To Tender documents.
11. This guarantee shall be interpreted in accordance with the laws of the State of Qatar and any proceedings for enforcement shall be brought before the competent court of the State of Qatar.
12. The Guarantor represents that this guarantee has been established in such form and with such content that it is fully and freely enforceable against the Guarantor in the manner provided in paragraph 11 above.

(Date)

[Common Seal of Signature of Guarantor or such other formality as may be required under the law to render a unilateral promise binding on the Guarantor]

- (1) - **Name of the Bank**
- (2) - **Address of the Bank**
- (3) - **Guarantor officer's name and position**
- (4) - **Invitation To Tender number**
- (5) - **The name of the Tenderer**
- (6) - **Address of the office of the Tenderer**
- (7) - **The amount of the Tender Bond as stipulated in PART A Section 1.0 of the Invitation To Tender package**
- (8) - **The Bank address for notices**
- (9) - **Date corresponding to the tender validity as stipulated in PART A Section 1.0 Attachment 1/3 of the Invitation To Tender package plus fifteen (15) calendar days**

Attachment—"C"
RASGAS
TENDER RESPONSE REQUIREMENTS
(SULPHIDIC CAUSTIC)

1. Will your company's use of this material be considered beneficial reuse and not disposal?

Yes

2. Documentation is attached demonstrating that under the environmental laws and regulations that are applicable to your company, that this material is not a waste.

Yes

3. Does your company subscribe to a set of governing principles regarding environmental stewardship, such as the Responsible Care program?

Yes

If "Yes", attach a copy.

CES Environmental Services, Inc. strictly adheres to Title 40 of the Code of Federal Regulations (parts 260-265 and 266-299) and to Title 30 of the Texas Administrative Code on Environmental Quality. Both documents can be found online. Further, CES has a number of large customers that insist on environmentally friendly practices and require audits on a regular basis.

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5. How long has your company been handling this type of materia1? **8 Years.**

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Yes

If "Yes", please attach detailed description of the technical support.

CES Environmental Services, Inc. employs a Research and Development Manager whose specialty is phenolics, cresylic acids, and related products (see attached resume). CES also employs a Chemical Engineer who provides technical support (see attached resume). Finally, the Product Sales Manager has fifteen years experience in the caustic business and created the attached powerpoint for product sales training.

7. Does your Company have an environmental audit program?

Yes

If "Yes", attach a copy.

Attached

8. Does your Company have more than one outlet for this material?

Yes

If "Yes", please describe them.

Wastewater neutralization, pulp and paper processing, specific gravity modification, caustic scrubbing (as a substitute for fresh caustic), and uses in the mining industry.

9. How many other companies supply you with a similar product?

21 companies including most major oil and gas companies.

Attachment "C"

RASGAS

Tender Response Requirements

Question 2

Documentation Demonstrating this Material is not a Waste

For complete listings of all regulations, visit
[http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=335](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=4&ti=30&pt=1&ch=335) and <http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=200121>



TCEQ REGULATORY GUIDANCE

Waste Permits Division
RG-240 • August 2006

Can I Recycle Some of My Industrial or Hazardous Wastes?

Purpose. The purpose of this document is to assist those who recycle industrial or hazardous waste or who are thinking about doing so. Please note the glossary of terms used in this document on page 5.

Regulatory References. The regulations that govern industrial and hazardous waste recycling are fairly complex. Texas regulations can be found on the TCEQ's web site at www.tceq.state.tx.us under the link "Rules, Policy & Legislation." Environmental regulations in Texas are codified in Title 30 of the Texas Administrative Code (30 TAC), while federal regulations are codified in Code of Federal Regulations, Title 40 (40 CFR). The federal regulations are available on the Environmental Protection Agency's (EPA) web site at www.epa.gov.

If you decide to recycle an industrial or hazardous waste, you should carefully review the following rules for the regulations that apply to your recycling activity:

- 30 TAC Section 335.1 (Definitions) (131)
- 30 TAC Chapter 335, Subchapter H (Standards for the Management of Specific Wastes and Specific Types of Facilities)
- 30 TAC Section 335.17 (Special Definitions for Recyclable Materials and Nonhazardous Recyclable Materials)
- 30 TAC Section 335.24 (Requirements for Recyclable Materials and Nonhazardous Recyclable Materials)
- 40 CFR Section 261.2 (Definition of Solid Waste)
- 40 CFR Section 261.4 (Exclusions)
- 40 CFR Section 261.6 (Requirements for Recyclable Materials)
- 40 CFR Section 266 (Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities)

Recycling Nonhazardous Industrial Waste. In general, the recycling of nonhazardous industrial

waste is subject to significantly less regulation than is the recycling of hazardous waste (which can come from either industrial or nonindustrial sources). For an explanation of terms, see the glossary section at the end of this document. In most cases, the recycling of *nonhazardous* industrial waste is subject only to the following requirements of 30 TAC Sections 335.4 (General Prohibitions) and 335.6 (Notification Requirements). The specific regulations for recycling nonhazardous industrial waste can be found in 30 TAC Section 335.24(h).

Certain *nonhazardous* industrial wastes can be directly applied to land. Under 30 TAC Section 335.1(131)(H), the waste may not even be a waste at all (see the table on pages 3–4, "Is My Material a Waste or Recyclable?"). If a *nonhazardous* industrial waste is legitimately recycled by land application, it is generally *not* subject to the deed recordation. To be sure, consult the requirements of 30 TAC Section 335.5 (Deed Recordation).

In most cases, facilities that recycle only nonhazardous industrial wastes are not subject to permitting requirements. However, there are exceptions (see 30 TAC Section 335.24(i)). Those facilities that recycle nonhazardous industrial wastes that are "combustible" or pose a significant threat to human health and the environment may be subject to certain financial assurance requirements (see 30 TAC Section 335.24(j)).

Inherently Waste-Like Materials. Some wastes are designated by the EPA as inherently waste-like. That means that there are very few, if any, ways that such wastes can be legitimately recycled, and that they are always considered to be wastes that are subject to stringent regulations on how they can be managed. Inherently waste-like materials can be identified by their EPA hazardous waste numbers. Those numbers are F020, F022, F023, F026, F028, and in some cases F021.

Notification Requirements. Generators of industrial waste that will be recycled must notify the TCEQ 90 days before they begin recycling their waste. This is true whether the waste is recycled on-site or off-site.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY • PO BOX 13087 • AUSTIN, TX 78711-3087

The TCEQ is an equal opportunity/affirmative action employer. The agency does not allow discrimination on the basis of race, color, religion, national origin, sex, disability, age, sexual orientation, or veteran status. In compliance with the Americans with Disabilities Act, this document may be requested in alternate formats by contacting the TCEQ at 512/239-0028, fax 239-4488, or 1-800-RELAY-TX (TDD), or by writing PO Box 13087, Austin TX 78711-3087. We authorize you to use or reproduce any original material contained in this publication – that is, any material we did not obtain from other sources. Please acknowledge the TCEQ as your source. Printed on recycled paper.

EPAHO120001688

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Table: Is My Material a Waste or Recyclable?

My material is ...	Which means that it is a waste if it...	However, it is not waste if it...
Applied to the land	Is used to make a product that is applied to or placed on the land (the resulting product is also considered a waste)	Is either a commercial chemical product whose normal and intended use is to be applied to or placed on the land or if the waste meets the criteria of Section 335.1(131)(H)
	Is applied to or placed on the land	
Burned	Is burned to recover energy	Is a fuel identified as a commercial chemical product whose normal and recognized use is as a fuel (for example, gasoline), if it meets the comparable fuel requirements found in 40 CFR Section 261.38, or if it meets the criteria for being a fuel/cutter stock found in the Fuels Peer Review Document
	Is used to produce a fuel (the resulting fuel is also regulated as a waste)	
	Is contained in a fuel (the resulting fuel is also regulated as a waste)	
Reclaimed (processed to recover a usable product, or regenerated)	Is a spent material (a material that has been used, and as a result of contamination, can no longer serve the purpose for which it was intended)	Is a pulping liquor reclaimed in a pulping liquor recovery furnace and then reused in the pulping process (unless accumulated speculatively), or it is a wood-preserving solution reclaimed and reused for its original intended purpose, or it is a wood-preserving wastewater that has been reclaimed and is reused to treat wood
	Is a "sludge" (which means a liquid, solid, or semi-solid) from either a wastewater treatment plant (other than an effluent) or an air pollution control device	Is a "sludge" which is not a listed hazardous waste and it is reclaimed, or if it is a residue from the treatment of K061 listed waste and meets specific requirements set forth in 40 CFR Section 261.4(a)(11)
	Is a "by-product"	Is a "by-product" that is not a listed hazardous waste
	Is a scrap metal/printed circuit board	Is either a scrap metal as defined in 30 TAC Section 335.17(9) or a printed circuit board,
	Is used or reused as an ingredient in an industrial process to make a product	Is a commercial chemical product
	Is then returned to the original process which generated it	Is an activity which meets the requirements for tanks; enclosure; combustion; speculative accumulation; and product usage found in 40 CFR Section 261.4(a)(8)
Accumulated speculatively	Is not a commercial chemical product	A commercial chemical product
An inherently waste-like material	Is a listed hazardous waste F020, F022, F023, F026, or F028	No exceptions exist
	Is a listed hazardous waste F021	Is used as an ingredient to make a product at the site at which it was generated [see 40 CFR Section 261.2(d)(1)]
A halogenated material	Is fed into a halogen acid furnace	Is a brominated material that meets the criteria found in 40 CFR Section 261.2(d)(2)
Used as an ingredient in an industrial process to make a product	Is reclaimed; used in a manner constituting disposal; used to produce products applied to the land; burned for energy recovery; used to produce a fuel; contained in fuels; accumulated speculatively; or inherently waste-like	Meets the terms of the exemptions found in 30 TAC Section 335.1(131)(F)(i), one of which is that the material not be reclaimed before being used

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Obtaining Forms. Notification forms TCEQ-0524 and -0525 can be obtained by following the "Forms" link on the TCEQ web site; by contacting TCEQ Publications at 512/239-0028 (voice) or 512/239-4488 (fax); or by writing to TCEQ Publications, MC-195, TCEQ, P.O. Box 13087, Austin, Texas 78711-3087.

For More Information. More information on what is a waste and on recycling industrial and hazardous waste in general can be obtained from:

- 30 TAC Section 335.1 and Section 335.17 (copies of these rules are available on the TCEQ web site at www.tceq.state.tx.us/rules/);
- 40 CFR Section 261.2 and Section 261.4(a), April 4, 1983, *Federal Register* (waste definition proposed) and January 4, 1985, *Federal Register* (waste definition published); and
- RCRA Online at www.epa.gov/rcraonline.

If you have questions, please contact the TCEQ's Industrial and Hazardous Waste Permits Section, at 512-239-6412.

Glossary of Terms. The following brief explanations are provided here for your convenience. These brief explanations do not take the place of any full, formal definitions in state rules or federal regulations.

accumulated speculatively—If, during the calendar year, starting January 1, 75% or more of the recycling material accumulated at the start of the year is not recycled, the material is "speculatively accumulated."

by-product—A material that is not one of the primary products of a production process and is not solely or separately produced by the production process.

deed recordation—The act of amending a deed to property to reflect the disposal of a waste on that property (deed recordation requirements are found in 30 TAC Section 335.5).

hazardous waste—Any waste identified or listed by the EPA as being hazardous in 40 CFR Section 261.3.

hazardous waste numbers—Alphanumeric characters that designate a waste as being hazardous.

industrial source—Any source of waste that is an industrial waste.

industrial waste (also known by its official name of "industrial solid waste")—A waste resulting from or incidental to any process of industry or

manufacturing or agricultural operation, which may include hazardous waste.

nonindustrial source—Any source of waste that is not an industrial source (see industrial waste).

nonwaste—A material that is not a waste (an example of which is a commercial chemical product being used for a legitimate purpose).

permit—A written document issued by the TCEQ which, by its conditions, may authorize the permittee to construct, install, modify, or operate a specified waste storage, processing, or disposal facility in accordance with specified limitations.

reclaimed—A material is reclaimed if it is processed to recover a usable product or if it is regenerated.

recycled—A material is recycled if it is used, reused, or reclaimed.

recycling material—A material intended for recycling.

scrap metal—Bits and pieces of metal parts (such as bars, turnings, rods, sheets, wires) or metal pieces that may be combined with bolts or soldering (such as in radiators, scrap automobiles, railroad boxcars, and so on) which when worn or superfluous can be recycled.

spent material—A material that has been used, and as a result of contamination, can no longer serve the purpose for which it was intended.

<<Prev Rule

Texas Administrative Code

Next Rule>>

TITLE 30

ENVIRONMENTAL QUALITY

PART 1

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

CHAPTER 335

INDUSTRIAL SOLID WASTE AND MUNICIPAL
HAZARDOUS WASTE

SUBCHAPTER A

INDUSTRIAL SOLID WASTE AND MUNICIPAL
HAZARDOUS WASTE IN GENERAL

RULE §335.1

Definitions

In addition to the terms defined in Chapter 3 of this title (relating to Definitions), the following words and terms, when used in this chapter, have the following meanings.

- (1) Aboveground tank--A device meeting the definition of tank in this section and that is situated in such a way that the entire surface area of the tank is completely above the plane of the adjacent surrounding surface and the entire surface area of the tank (including the tank bottom) is able to be visually inspected.
- (2) Act--Texas Health and Safety Code, Chapter 361.
- (3) Active life--The period from the initial receipt of hazardous waste at the facility until the executive director receives certification of final closure.
- (4) Active portion--That portion of a facility where processing, storage, or disposal operations are being or have been conducted after November 19, 1980, and which is not a closed portion. (See also "closed portion" and "inactive portion.")
- (5) Activities associated with the exploration, development, and protection of oil or gas or geothermal resources--Activities associated with:
 - (A) the drilling of exploratory wells, oil wells, gas wells, or geothermal resource wells;
 - (B) the production of oil or gas or geothermal resources, including:
 - (i) activities associated with the drilling of injection water source wells that penetrate the base of usable quality water;
 - (ii) activities associated with the drilling of cathodic protection holes associated with the cathodic protection of wells and pipelines subject to the jurisdiction of the commission to regulate the production of oil or gas or geothermal resources;
 - (iii) activities associated with gasoline plants, natural gas or natural gas liquids processing plants, pressure maintenance plants, or repressurizing plants;
 - (iv) activities associated with any underground natural gas storage facility, provided the terms "natural gas" and "storage facility" shall have the meanings set out in the Texas Natural Resources Code, §1.173;

Q2

(v) activities associated with any underground hydrocarbon storage facility, provided the terms "hydrocarbons" and "underground hydrocarbon storage facility" shall have the meanings set out in the Texas Natural Resources Code, §91.201; and

(vi) activities associated with the storage, handling, reclamation, gathering, transportation, or distribution of oil or gas prior to the refining of such oil or prior to the use of such gas in any manufacturing process or as a residential or industrial fuel;

(C) the operation, abandonment, and proper plugging of wells subject to the jurisdiction of the commission to regulate the exploration, development, and production of oil or gas or geothermal resources; and

(D) the discharge, storage, handling, transportation, reclamation, or disposal of waste or any other substance or material associated with any activity listed in subparagraphs (A) - (C) of this paragraph, except for waste generated in connection with activities associated with gasoline plants, natural gas or natural gas liquids processing plants, pressure maintenance plants, or repressurizing plants if that waste is a hazardous waste as defined by the administrator of the United States Environmental Protection Agency in accordance with the Federal Solid Waste Disposal Act, as amended (42 United States Code, §§6901 *et seq.*).

(6) Administrator--The administrator of the United States Environmental Protection Agency or his designee.

(7) Ancillary equipment--Any device that is used to distribute, meter, or control the flow of solid waste or hazardous waste from its point of generation to a storage or processing tank(s), between solid waste or hazardous waste storage and processing tanks to a point of disposal on site, or to a point of shipment for disposal off site. Such devices include, but are not limited to, piping, fittings, flanges, valves, and pumps.

(8) Aquifer--A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

(9) Area of concern--Any area of a facility under the control or ownership of an owner or operator where a release to the environment of hazardous wastes or hazardous constituents has occurred, is suspected to have occurred, or may occur, regardless of the frequency or duration.

(10) Authorized representative--The person responsible for the overall operation of a facility or an operation unit (i.e., part of a facility), e.g., the plant manager, superintendent, or person of equivalent responsibility.

(11) Battery--As defined in §335.261 of this title (relating to Universal Waste Rule).

(12) Boiler--An enclosed device using controlled flame combustion and having the following characteristics:

(A) the unit must have physical provisions for recovering and exporting thermal energy in the form of steam, heated fluids, or heated gases;

(B) the unit's combustion chamber and primary energy recovery section(s) must be of integral design. To be of integral design, the combustion chamber and the primary energy recovery section(s)

(such as waterwalls and superheaters) must be physically formed into one manufactured or assembled unit. A unit in which the combustion chamber and the primary energy recovery section(s) are joined only by ducts or connections carrying flue gas is not integrally designed; however, secondary energy recovery equipment (such as economizers or air preheaters) need not be physically formed into the same unit as the combustion chamber and the primary energy recovery section. The following units are not precluded from being boilers solely because they are not of integral design:

(i) process heaters (units that transfer energy directly to a process stream); and

(ii) fluidized bed combustion units;

(C) while in operation, the unit must maintain a thermal energy recovery efficiency of at least 60%, calculated in terms of the recovered energy compared with the thermal value of the fuel; and

(D) the unit must export and utilize at least 75% of the recovered energy, calculated on an annual basis. In this calculation, no credit shall be given for recovered heat used internally in the same unit. (Examples of internal use are the preheating of fuel or combustion air, and the driving of induced or forced draft fans or feedwater pumps); or

(E) the unit is one which the executive director has determined, on a case-by-case basis, to be a boiler, after considering the standards in §335.20 of this title (relating to Variance To Be Classified as a Boiler).

(13) Captive facility--A facility that accepts wastes from only related (within the same corporation) off-site generators.

(14) Captured facility--A manufacturing or production facility that generates an industrial solid waste or hazardous waste that is routinely stored, processed, or disposed of on a shared basis in an integrated waste management unit owned, operated by, and located within a contiguous manufacturing complex.

(15) Captured receiver--A receiver that is located within the property boundaries of the generators from which it receives waste.

(16) Carbon regeneration unit--Any enclosed thermal treatment device used to regenerate spent activated carbon.

(17) Certification--A statement of professional opinion based upon knowledge and belief.

(18) Class 1 wastes--Any industrial solid waste or mixture of industrial solid wastes which because of its concentration, or physical or chemical characteristics, is toxic, corrosive, flammable, a strong sensitizer or irritant, a generator of sudden pressure by decomposition, heat, or other means, or may pose a substantial present or potential danger to human health or the environment when improperly processed, stored, transported, or disposed of or otherwise managed, as further defined in §335.505 of this title (relating to Class 1 Waste Determination).

(19) Class 2 wastes--Any individual solid waste or combination of industrial solid waste which cannot be described as hazardous, Class 1, or Class 3 as defined in §335.506 of this title (relating to Class 2 Waste Determination).

(20) Class 3 wastes--Inert and essentially insoluble industrial solid waste, usually including, but not

principles of engineering and mathematics, acquired by a professional education and related practical experience, is qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks. Such a person must be certified as being qualified by the National Association of Corrosion Engineers or be a registered professional engineer who has certification or licensing that includes education and experience in corrosion control on buried or submerged metal piping systems and metal tanks.

(34) Decontaminate--To apply a treatment process(es) to wastes or contaminated media whereby the substantial present or future threat to human health and the environment is eliminated.

(35) Designated facility--A Class 1 or hazardous waste treatment, storage, or disposal facility which has received a United States Environmental Protection Agency permit (or a facility with interim status) in accordance with the requirements of 40 Code of Federal Regulations (CFR) Parts 270 and 124; a permit from a state authorized in accordance with 40 CFR Part 271 (in the case of hazardous waste); a permit issued in accordance with §335.2 of this title (relating to Permit Required) (in the case of nonhazardous waste); or that is regulated under §335.24(f), (g), or (h) of this title (relating to Requirements for Recyclable Materials and Nonhazardous Recyclable Materials) or §335.241 of this title (relating to Applicability and Requirements) and that has been designated on the manifest by the generator in accordance with §335.10 of this title (relating to Shipping and Reporting Procedures Applicable to Generators of Hazardous Waste or Class 1 Waste and Primary Exporters of Hazardous Waste). If a waste is destined to a facility in an authorized state which has not yet obtained authorization to regulate that particular waste as hazardous, then the designated facility must be a facility allowed by the receiving state to accept such waste. Designated facility also means a generator site designated on the manifest to receive its waste as a return shipment from a facility that has rejected the waste in accordance with §335.12(e) of this title (relating to Shipping Requirements Applicable to Owners or Operators of Cont'd...

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TITLE 30

ENVIRONMENTAL QUALITY

PART 1

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

CHAPTER 335

INDUSTRIAL SOLID WASTE AND MUNICIPAL HAZARDOUS WASTE

SUBCHAPTER A

INDUSTRIAL SOLID WASTE AND MUNICIPAL HAZARDOUS WASTE IN GENERAL

RULE §335.1

Definitions

Treatment, Storage, or Disposal Facilities).

(36) Destination facility--Has the definition adopted under §335.261 of this title (relating to Universal Waste Rule).

(37) Dike--An embankment or ridge of either natural or man-made materials used to prevent the movement of liquids, sludges, solids, or other materials.

(38) Dioxins and furans (D/F)--Tetra, penta, hexa, hepta, and octa-chlorinated dibenzo dioxins and furans.

(39) Discharge or hazardous waste discharge--The accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of waste into or on any land or water.

(40) Disposal--The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste (whether containerized or uncontainerized) into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

(41) Disposal facility--A facility or part of a facility at which solid waste is intentionally placed into or on any land or water, and at which waste will remain after closure. The term "disposal facility" does not include a corrective action management unit into which remediation wastes are placed.

(42) Drip pad--An engineered structure consisting of a curbed, free-draining base, constructed of non-earthen materials and designed to convey preservative kick-back or drippage from treated wood, precipitation, and surface water run-on to an associated collection system at wood preserving plants.

(43) Elementary neutralization unit--A device which:

(A) is used for neutralizing wastes which are hazardous only because they exhibit the corrosivity characteristic defined in 40 Code of Federal Regulations (CFR) §261.22, or are listed in 40 CFR Part 261, Subpart D, only for this reason; or is used for neutralizing the pH of non-hazardous industrial solid waste; and

(B) meets the definition of tank, tank system, container, transport vehicle, or vessel as defined in this section.

(44) United States Environmental Protection Agency (EPA) acknowledgment of consent--The cable

sent to EPA from the United States Embassy in a receiving country that acknowledges the written consent of the receiving country to accept the hazardous waste and describes the terms and conditions of the receiving country's consent to the shipment.

(45) United States Environmental Protection Agency (EPA) hazardous waste number--The number assigned by the EPA to each hazardous waste listed in 40 Code of Federal Regulations (CFR) Part 261, Subpart D and to each characteristic identified in 40 CFR Part 261, Subpart C.

(46) United States Environmental Protection Agency (EPA) identification number--The number assigned by the EPA or the commission to each generator, transporter, and processing, storage, or disposal facility.

(47) Essentially insoluble--Any material, which if representatively sampled and placed in static or dynamic contact with deionized water at ambient temperature for seven days, will not leach any quantity of any constituent of the material into the water in excess of current United States Public Health Service or United States Environmental Protection Agency limits for drinking water as published in the *Federal Register*.

(48) Equivalent method--Any testing or analytical method approved by the administrator under 40 Code of Federal Regulations §260.20 and §260.21.

(49) Existing portion--That land surface area of an existing waste management unit, included in the original Part A permit application, on which wastes have been placed prior to the issuance of a permit.

(50) Existing tank system or existing component--A tank system or component that is used for the storage or processing of hazardous waste and that is in operation, or for which installation has commenced on or prior to July 14, 1986. Installation will be considered to have commenced if the owner or operator has obtained all federal, state, and local approvals or permits necessary to begin physical construction of the site or installation of the tank system and if either:

(A) a continuous on-site physical construction or installation program has begun; or

(B) the owner or operator has entered into contractual obligations--which cannot be canceled or modified without substantial loss--for physical construction of the site or installation of the tank system to be completed within a reasonable time.

(51) Explosives or munitions emergency--A situation involving the suspected or detected presence of unexploded ordnance, damaged or deteriorated explosives or munitions, an improvised explosive device, other potentially explosive material or device, or other potentially harmful military chemical munitions or device, that creates an actual or potential imminent threat to human health, including safety, or the environment, including property, as determined by an explosives or munitions emergency response specialist. These situations may require immediate and expeditious action by an explosives or munitions emergency response specialist to control, mitigate, or eliminate the threat.

(52) Explosives or munitions emergency response--All immediate response activities by an explosives and munitions emergency response specialist to control, mitigate, or eliminate the actual or potential threat encountered during an explosives or munitions emergency, subject to the following:

(A) an explosives or munitions emergency response includes in-place render-safe procedures, treatment or destruction of the explosives or munitions and/or transporting those items to another

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location to be rendered safe, treated, or destroyed;

(B) any reasonable delay in the completion of an explosives or munitions emergency response caused by a necessary, unforeseen, or uncontrollable circumstance will not terminate the explosives or munitions emergency; and

(C) explosives and munitions emergency responses can occur on either public or private lands and are not limited to responses at hazardous waste facilities.

(53) Explosives or munitions emergency response specialist--An individual trained in chemical or conventional munitions or explosives handling, transportation, render-safe procedures, or destruction techniques, including United States Department of Defense (DOD) emergency explosive ordnance disposal, technical escort unit, and DOD-certified civilian or contractor personnel; and, other federal, state, or local government, or civilian personnel similarly trained in explosives or munitions emergency responses.

(54) Extrusion--A process using pressure to force ground poultry carcasses through a decreasing-diameter barrel or nozzle, causing the generation of heat sufficient to kill pathogens, and resulting in an extruded product acceptable as a feed ingredient.

(55) Facility--Includes:

(A) all contiguous land, and structures, other appurtenances, and improvements on the land, used for storing, processing, or disposing of municipal hazardous waste or industrial solid waste. A facility may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, or combinations of them);

(B) for the purpose of implementing corrective action under §335.167 of this title (relating to Corrective Action for Solid Waste Management Units), all contiguous property under the control of the owner or operator seeking a permit for the treatment, storage, and/or disposal of hazardous waste. This definition also applies to facilities implementing corrective action under Texas Water Code, §7.031 (Corrective Action Relating to Hazardous Waste).

(56) Final closure--The closure of all hazardous waste management units at the facility in accordance with all applicable closure requirements so that hazardous waste management activities under Subchapter E of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities) and Subchapter F of this chapter (relating to Permitting Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities) are no longer conducted at the facility unless subject to the provisions in §335.69 of this title (relating to Accumulation Time).

(57) Food-chain crops--Tobacco, crops grown for human consumption, and crops grown for feed for animals whose products are consumed by humans.

(58) Freeboard--The vertical distance between the top of a tank or surface impoundment dike, and the surface of the waste contained therein.

(59) Free liquids--Liquids which readily separate from the solid portion of a waste under ambient temperature and pressure.

(60) Generator--Any person, by site, who produces municipal hazardous waste or industrial solid waste; any person who possesses municipal hazardous waste or industrial solid waste to be shipped to any other person; or any person whose act first causes the solid waste to become subject to regulation under this chapter. For the purposes of this regulation, a person who generates or possesses Class 3 wastes only shall not be considered a generator.

(61) Groundwater--Water below the land surface in a zone of saturation.

(62) Hazardous industrial waste--Any industrial solid waste or combination of industrial solid wastes identified or listed as a hazardous waste by the administrator of the United States Environmental Protection Agency in accordance with the Resource Conservation and Recovery Act of 1976, §3001 (42 United States Code, §6921). The administrator has identified the characteristics of hazardous wastes and listed certain wastes as hazardous in 40 Code of Federal Regulations Part 261. The executive director will maintain in the offices of the commission a current list of hazardous wastes, a current set of characteristics of hazardous waste, and applicable appendices, as promulgated by the administrator.

(63) Hazardous substance--Any substance designated as a hazardous substance under 40 Code of Federal Regulations Part 302.

(64) Hazardous waste--Any solid waste identified or listed as a hazardous waste by the administrator of the United States Environmental Protection Agency in accordance with the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, 42 United States Code, §§6901 *et seq.*

(65) Hazardous waste constituent--A constituent that caused the administrator to list the hazardous waste in 40 Code of Federal Regulations (CFR) Part 261, Subpart D or a constituent listed in Table 1 of 40 CFR §261.24.

(66) Hazardous waste management facility--All contiguous land, including structures, appurtenances, and other improvements on the land, used for processing, storing, or disposing of hazardous waste. The term includes a publicly- or privately-owned hazardous waste management facility consisting of processing, storage, or disposal operational hazardous waste management units such as one or more landfills, surface impoundments, waste piles, incinerators, boilers, and industrial furnaces, including cement kilns, injection wells, salt dome waste containment caverns, land treatment facilities, or a combination of units.

(67) Hazardous waste management unit--A landfill, surface impoundment, waste pile, industrial furnace, incinerator, cement kiln, injection well, container, drum, salt dome waste containment cavern, or land treatment unit, or any other structure, vessel, appurtenance, or other improvement on land used to manage hazardous waste.

(68) In operation--Refers to a facility which is processing, storing, or disposing of solid waste or hazardous waste.

(69) Inactive portion--That portion of a facility which is not operated after November 19, 1980. (See also "active portion" and "closed portion.")

(70) Incinerator--Any enclosed device that:

(A) uses controlled flame combustion and neither meets the criteria for classification as a boiler,

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sludge dryer, or carbon regeneration unit, nor is listed as an industrial furnace; or

(B) meets the definition of infrared incinerator or plasma arc incinerator.

(71) Incompatible waste--A hazardous waste which is unsuitable for:

(A) placement in a particular device or facility because it may cause corrosion or decay of containment materials (e.g., container inner liners or tank walls); or

(B) commingling with another waste or material under uncontrolled conditions because the commingling might produce heat or pressure, fire or explosion, violent reaction, toxic dusts, mists, fumes, or gases, or flammable fumes or gases.

(72) Individual generation site--The contiguous site at or on which one or more solid waste or hazardous wastes are generated. An individual generation site, such as a large manufacturing plant, may have one or more sources of solid waste or hazardous waste, but is considered a single or individual generation site if the site or property is contiguous.

(73) Industrial furnace--Includes any of the following enclosed devices that use thermal treatment to accomplish recovery of materials or energy:

(A) cement kilns;

(B) lime kilns;

(C) aggregate kilns;

(D) phosphate kilns;

(E) coke ovens;

(F) blast furnaces;

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(G) smelting, melting, and refining furnaces (including pyrometallurgical devices such as cupolas, reverberator furnaces, sintering machines, roasters, and foundry furnaces);

(H) titanium dioxide chloride process oxidation reactors;

(I) methane reforming furnaces;

(J) pulping liquor recovery furnaces;

(K) combustion devices used in the recovery of sulfur values from spent sulfuric acid;

(L) halogen acid furnaces for the production of acid from halogenated hazardous waste generated by chemical production facilities where the furnace is located on the site of a chemical production facility, the acid product has a halogen acid content of at least 3.0%, the acid product is used in a manufacturing process, and, except for hazardous waste burned as fuel, hazardous waste fed to the furnace has a minimum halogen content of 20% as generated; and

(M) other devices the commission may list, after the opportunity for notice and comment is afforded to the public.

(74) Industrial solid waste--Solid waste resulting from or incidental to any process of industry or manufacturing, or mining or agricultural operation, which may include hazardous waste as defined in this section.

(75) Infrared incinerator--Any enclosed device that uses electric powered resistance heaters as a source of radiant heat followed by an afterburner using controlled flame combustion and which is not listed as an industrial furnace.

(76) Inground tank--A device meeting the definition of tank in this section whereby a portion of the tank wall is situated to any degree within the ground, thereby preventing visual inspection of that external surface area of the tank that is in the ground.

(77) Injection well--A well into which fluids are injected. (See also "underground injection.")

(78) Inner liner--A continuous layer of material placed inside a tank or container which protects the construction materials of the tank or container from the contained waste or reagents used to treat the waste.

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(79) Installation inspector--A person who, by reason of his knowledge of the physical sciences and the principles of engineering, acquired by a professional education and related practical experience, is qualified to supervise the installation of tank systems.

(80) International shipment--The transportation of hazardous waste into or out of the jurisdiction of the United States.

(81) Lamp--Has the definition adopted under §335.261 of this title (relating to Universal Waste Rule).

(82) Land treatment facility--A facility or part of a facility at which solid waste or hazardous waste is applied onto or incorporated into the soil surface and that is not a corrective action management unit; such facilities are disposal facilities if the waste will remain after closure.

(83) Landfill--A disposal facility or part of a facility where solid waste or hazardous waste is placed in or on land and which is not a pile, a land treatment facility, a surface impoundment, an injection well, a salt dome formation, a salt bed formation, an underground mine, a cave, or a corrective action management unit.

(84) Landfill cell--A discrete volume of a solid waste or hazardous waste landfill which uses a liner to provide isolation of wastes from adjacent cells or wastes. Examples of landfill cells are trenches and pits.

(85) Leachate--Any liquid, including any suspended components in the liquid, that has percolated through or drained from solid waste or hazardous waste.

(86) Leak-detection system--A system capable of detecting the failure of either the primary or secondary containment structure or the presence of a release of solid waste or hazardous waste or accumulated liquid in the secondary containment structure. Such a system must employ operational controls (e.g., daily visual inspections for releases into the secondary containment system of aboveground tanks) or consist of an interstitial monitoring device designed to detect continuously and automatically the failure of the primary or secondary containment structure or the presence of a release of solid waste or hazardous waste into the secondary containment structure.

(87) Licensed professional geoscientist--A geoscientist who maintains a current license through the Texas Board of Professional Geoscientists in accordance with its requirements for professional practice.

(88) Liner--A continuous layer of natural or man-made materials, beneath or on the sides of a surface impoundment, landfill, or landfill cell, which restricts the downward or lateral escape of solid waste or hazardous waste, hazardous waste constituents, or leachate.

(89) Management or hazardous waste management--The systematic control of the collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of solid waste or hazardous waste.

(90) Manifest--The waste shipping document, United States Environmental Protection Agency (EPA) Form 8700-22, originated and signed by the generator or offeror, that will accompany and be used for tracking the transportation, disposal, treatment, storage, or recycling of shipments of hazardous wastes or Class 1 industrial solid wastes. The form used for this purpose is the EPA Form 8700-22, obtainable from any printer registered with the EPA.

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(91) Manifest tracking number--The alphanumeric identification number (i.e., a unique three-letter suffix preceded by nine numerical digits), which is pre-printed on the manifest by a registered source.

(92) Military munitions--All ammunition products and components produced or used by or for the Department of Defense (DOD) or the United States Armed Services for national defense and security, including military munitions under the control of the DOD, the United States Coast Guard, the United States Department of Energy (DOE), and National Guard personnel. The term "military munitions":

(A) includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries used by DOD components, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof; and

(B) includes non-nuclear components of nuclear devices, managed under DOE's nuclear weapons program after all required sanitization operations under the Atomic Energy Act of 1954, as amended, have been completed; but

(C) does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components thereof.

(93) Miscellaneous unit--A hazardous waste management unit where hazardous waste is stored, processed, or disposed of and that is not a container, tank, surface impoundment, pile, land treatment unit, landfill, incinerator, boiler, industrial furnace, underground injection well with appropriate technical standards under Chapter 331 of this title (relating to Underground Injection Control), corrective action management unit, containment building, staging pile, or unit eligible for a research, development, and demonstration permit or under Chapter 305, Subchapter K of this title (relating to Research, Development, and Demonstration Permits).

(94) Movement--That solid waste or hazardous waste transported to a facility in an individual vehicle.

(95) Municipal hazardous waste--A municipal solid waste or mixture of municipal solid wastes which has been identified or listed as a hazardous waste by the administrator of the United States Environmental Protection Agency.

(96) Municipal solid waste--Solid waste resulting from or incidental to municipal, community, commercial, institutional, and recreational activities; including garbage, rubbish, ashes, street cleanings, dead animals, abandoned automobiles, and all other solid waste other than industrial waste.

(97) New tank system or new tank component--A tank system or component that will be used for the storage or processing of hazardous waste and for which installation has commenced after July 14, 1986; except, however, for purposes of 40 Code of Federal Regulations (CFR) §264.193(g)(2) (incorporated by reference at §335.152(a)(8) of this title (relating to Standards)) and 40 CFR §265.193(g)(2) (incorporated by reference at §335.112(a)(9) of this title (relating to Standards)), a new tank system is one for which construction commences after July 14, 1986. (See also "existing tank system.")

(98) Off-site--Property which cannot be characterized as on-site.

(99) Onground tank--A device meeting the definition of tank in this section and that is situated in such

a way that the bottom of the tank is on the same level as the adjacent surrounding surface so that the external tank bottom cannot be visually inspected.

(100) On-Site--The same or geographically contiguous property which may be divided by public or private rights-of-way, provided the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing, as opposed to going along, the right-of-way. Noncontiguous properties owned by the same person but connected by a right-of-way which he controls and to which the public does not have access, is also considered on-site property.

(101) Open burning--The combustion of any material without the following characteristics:

(A) control of combustion air to maintain adequate temperature for efficient combustion;

(B) containment of the combustion-reaction in an enclosed device to provide sufficient residence time and mixing for complete combustion; and

(C) control of emission of the gaseous combustion products. (See also "incineration" and "thermal treatment.")

(102) Operator--The person responsible for the overall operation of a facility.

(103) Owner--The person who owns a facility or part of a facility.

(104) Partial closure--The closure of a hazardous waste management unit in accordance with the applicable closure requirements of Subchapters E and F of this chapter (relating to Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities; and Permitting Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities) at a facility that contains other active hazardous waste management units. For example, partial closure may include the closure of a tank (including its associated piping and underlying containment systems), landfill cell, surface impoundment, waste pile, or other hazardous waste management unit, while other units of the same facility continue to operate.

(105) PCBs or polychlorinated biphenyl compounds--Compounds subject to 40 Code of Federal Regulations Part 761.

(106) Permit--A written permit issued by the commission which, by its conditions, may authorize the permittee to construct, install, modify, or operate a specified municipal hazardous waste or industrial solid waste treatment, storage, or disposal facility in accordance with specified limitations.

(107) Personnel or facility personnel--All persons who work at, or oversee the operations of, a solid waste or hazardous waste facility, and whose actions or failure to act may result in noncompliance with the requirements of this chapter.

(108) Pesticide--Has the definition adopted under §335.261 of this title (relating to Universal Waste Rule).

(109) Petroleum substance--A crude oil or any refined or unrefined fraction or derivative of crude oil which is a liquid at standard conditions of temperature and pressure.

(A) Except as provided in subparagraph (C) of this paragraph for the purposes of this chapter, a

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"petroleum substance" shall be limited to a substance in or a combination or mixture of substances within the following list (except for any listed substance regulated as a hazardous waste under the federal Solid Waste Disposal Act, Subtitle C (42 United States Code (USC), §§6921, *et seq.*)) and which is liquid at standard conditions of temperature (20 degrees Centigrade) and pressure (1 atmosphere):

(i) basic petroleum substances--i.e., crude oils, crude oil fractions, petroleum feedstocks, and petroleum fractions;

(ii) motor fuels--a petroleum substance which is typically used for the operation of internal combustion engines and/or motors (which includes, but is not limited to, stationary engines and engines used in transportation vehicles and marine vessels);

(iii) aviation gasolines--i.e., Grade 80, Grade 100, and Grade 100-LL;

(iv) aviation jet fuels--i.e., Jet A, Jet A-1, Jet B, JP-4, JP-5, and JP-8;

(v) distillate fuel oils--i.e., Number 1-D, Number 1, Number 2-D, and Number 2;

(vi) residual fuel oils--i.e., Number 4-D, Number 4-light, Number 4, Number 5-light, Number 5-heavy, and Number 6;

(vii) gas-turbine fuel oils--i.e., Grade O-GT, Grade 1-GT, Grade 2-GT, Grade 3-GT, and Grade 4-GT;

(viii) illuminating oils--i.e., kerosene, mineral seal oil, long-time burning oils, 300 oil, and mineral colza oil;

(ix) lubricants--i.e., automotive and industrial lubricants;

(x) building materials--i.e., liquid asphalt and dust-laying oils;

(xi) insulating and waterproofing materials--i.e., transformer oils and cable oils; and

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(xii) used oils--See definition for "used oil" in this section.

(B) For the purposes of this chapter, a "petroleum substance" shall include solvents or a combination or mixture of solvents (except for any listed substance regulated as a hazardous waste under the federal Solid Waste Disposal Act, Subtitle C (42 USC, §§6921, *et seq.*)) and which is liquid at standard conditions of temperature (20 degrees Centigrade) and pressure (1 atmosphere) i.e., Stoddard solvent, petroleum spirits, mineral spirits, petroleum ether, varnish makers' and painters' naphthas, petroleum extender oils, and commercial hexane.

(C) The following materials are not considered petroleum substances:

(i) polymerized materials, i.e., plastics, synthetic rubber, polystyrene, high and low density polyethylene;

(ii) animal, microbial, and vegetable fats;

(iii) food grade oils;

(iv) hardened asphalt and solid asphaltic materials--i.e., roofing shingles, roofing felt, hot mix (and cold mix); and

(v) cosmetics.

(110) Pile--Any noncontainerized accumulation of solid, nonflowing solid waste or hazardous waste that is used for processing or storage, and that is not a corrective action management unit or a containment building.

(111) Plasma arc incinerator--Any enclosed device using a high intensity electrical discharge or arc as a source of heat followed by an afterburner using controlled flame combustion and which is not listed as an industrial furnace.

(112) Post-closure order--An order issued by the commission for post-closure care of interim status units, a corrective action management unit unless authorized by permit, or alternative corrective action requirements for contamination commingled from Resource Conservation and Recovery Act and solid waste management units.

(113) Poultry--Chickens or ducks being raised or kept on any premises in the state for profit.

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(114) Poultry carcass--The carcass, or part of a carcass, of poultry that died as a result of a cause other than intentional slaughter for use for human consumption.

(115) Poultry facility--A facility that:

(A) is used to raise, grow, feed, or otherwise produce poultry for commercial purposes; or

(B) is a commercial poultry hatchery that is used to produce chicks or ducklings.

(116) Primary exporter--Any person who is required to originate the manifest for a shipment of hazardous waste in accordance with the regulations contained in 40 Code of Federal Regulations Part 262, Subpart B, which are in effect as of November 8, 1986, or equivalent state provision, which specifies a treatment, storage, or disposal facility in a receiving country as the facility to which the hazardous waste will be sent and any intermediary arranging for the export.

(117) Processing--The extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of solid waste or hazardous waste, designed to change the physical, chemical, or biological character or composition of any solid waste or hazardous waste so as to neutralize such waste, or so as to recover energy or material from the waste or so as to render such waste nonhazardous, or less hazardous; safer to transport, store or dispose of; or amenable for recovery, amenable for storage, or reduced in volume. The transfer of solid waste for reuse or disposal as used in this definition does not include the actions of a transporter in conveying or transporting solid waste by truck, ship, pipeline, or other means. Unless the executive director determines that regulation of such activity is necessary to protect human health or the environment, the definition of processing does not include activities relating to those materials exempted by the administrator of the United States Environmental Protection Agency in accordance with the federal Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act, 42 United States Code, §§6901 *et seq.*, as amended.

(118) Publicly-owned treatment works (POTW)--Any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a state or municipality (as defined by the Clean Water Act, §502(4)). The definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

(119) Qualified groundwater scientist--A scientist or engineer who has received a baccalaureate or post-graduate degree in the natural sciences or engineering, and has sufficient training and experience in groundwater hydrology and related fields as may be demonstrated by state registration, professional certifications, or completion of accredited university courses that enable that individual to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport.

(120) Receiving country--A foreign country to which a hazardous waste is sent for the purpose of treatment, storage, or disposal (except short-term storage incidental to transportation).

(121) Regional administrator--The regional administrator for the United States Environmental Protection Agency region in which the facility is located, or his designee.

(122) Remediation--The act of eliminating or reducing the concentration of contaminants in contaminated media.

(123) Remediation waste--All solid and hazardous wastes, and all media (including groundwater, surface water, soils, and sediments) and debris, which contain listed hazardous wastes or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements under §335.167 of this title (relating to Corrective Action for Solid Waste Management Units) and Texas Water Code, §7.031 (Corrective Action Relating to Hazardous Waste). For a given facility, remediation wastes may originate only from within the facility boundary, but may include waste managed in implementing corrective action for releases beyond the facility boundary under §335.166(5) of this title (relating to Corrective Action Program) or §335.167(c) of this title.

(124) Remove--To take waste, contaminated design or operating system components, or contaminated media away from a waste management unit, facility, or area to another location for treatment, storage, or disposal.

(125) Replacement unit--A landfill, surface impoundment, or waste pile unit:

(A) from which all or substantially all the waste is removed; and

(B) that is subsequently reused to treat, store, or dispose of hazardous waste. "Replacement unit" does not apply to a unit from which waste is removed during closure, if the subsequent reuse solely involves the disposal of waste from that unit and other closing units or corrective action areas at the facility, in accordance with an approved closure plan or United States Environmental Protection Agency or state approved corrective action.

(126) Representative sample--A sample of a universe or whole (e.g., waste pile, lagoon, groundwater) which can be expected to exhibit the average properties of the universe or whole.

(127) Run-off--Any rainwater, leachate, or other liquid that drains over land from any part of a facility.

(128) Run-on--Any rainwater, leachate, or other liquid that drains over land onto any part of a facility.

(129) Saturated zone or zone of saturation--That part of the earth's crust in which all voids are filled with water.

(130) Shipment--Any action involving the conveyance of municipal hazardous waste or industrial solid waste by any means off-site.

(131) Sludge dryer--Any enclosed thermal treatment device that is used to dehydrate sludge and that has a maximum total thermal input, excluding the heating valve of the sludge itself, of 2,500 British thermal units per pound of sludge treated on a wet-weight basis.

(132) Small quantity generator--A generator who generates less than 1,000 kilograms of hazardous waste in a calendar month.

(133) Solid waste--

(A) Any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant or air pollution control facility, and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, municipal, commercial, mining, and agricultural operations,

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and from community and institutional activities, but does not include:

(i) solid or dissolved material in domestic sewage, or solid or dissolved material in irrigation return flows, or industrial discharges subject to regulation by permit issued in accordance with Texas Water Code, Chapter 26 (an exclusion applicable only to the actual point source discharge that does not exclude industrial wastewaters while they are being collected, stored, or processed before discharge, nor does it exclude sludges that are generated by industrial wastewater treatment);

(ii) uncontaminated soil, dirt, rock, sand, and other natural or man-made inert solid materials used to fill land if the object of the fill is to make the land suitable for the construction of surface improvements. The material serving as fill may also serve as a surface improvement such as a structure foundation, a road, soil erosion control, and flood protection. Man-made materials exempted under this provision shall only be deposited at sites where the construction is in progress or imminent such that rights to the land are secured and engineering, architectural, or other necessary planning have been initiated. Waste disposal shall be considered to have occurred on any land which has been filled with man-made inert materials under this provision if the land is sold, leased, or otherwise conveyed prior to the completion of construction of the surface improvement. Under such conditions, deed recordation shall be required. The deed recordation shall include the information required under §335.5(a) of this title (relating to Deed Recordation of Waste Disposal), prior to sale or other conveyance of the property;

(iii) waste materials which result from activities associated with the exploration, development, or production of oil or gas or geothermal resources, as those activities are defined in this section, and any other substance or material regulated by the Railroad Commission of Texas in accordance with the Natural Resources Code, §91.101, unless such waste, substance, or material results from activities associated with gasoline plants, natural gas, or natural gas liquids processing plants, pressure maintenance plants, or repressurizing plants and is a hazardous waste as defined by the administrator of the United States Environmental Protection Agency in accordance with the federal Solid Waste Disposal Act, 42 United States Code, §§6901 *et seq.*, as amended; or

(iv) a material excluded by 40 Code of Federal Regulations (CFR) §261.4(a)(1) - (21), as amended through July 24, 2002 (67 FR 48393), subject to the changes in this clause, or by variance granted under §335.18 of this title (relating to Variances from Classification as a Solid Waste) and §335.19 of this title (relating to Standards and Criteria for Variances from Classification as a Solid Waste). For the purposes of the exclusion under 40 CFR §261.4(a)(16), 40 CFR §261.38 is adopted by reference as amended through July 10, 2000 (65 FR 42292), and is revised as follows, with "subparagraph (A)(iv) under the definition of 'Solid Waste' in 30 TAC §335.1" meaning "subparagraph (A)(iv) under the definition of 'Solid Waste' in §335.1 of this title (relating to Definitions)":

(I) in the certification statement under 40 CFR §261.38(c)(1)(i)(C)(4), the reference to "40 CFR §261.38" is changed to "40 CFR §261.38, as revised under subparagraph (A)(iv) under the definition of 'Solid Waste' in 30 TAC §335.1," and the reference to "40 CFR §261.28(c)(10)" is changed to "40 CFR §261.38(c)(10)";

(II) in 40 CFR §261.38(c)(2), the references to "§260.10 of this chapter" are changed to "§335.1 of this title (relating to Definitions)," and the reference to "parts 264 or 265 of this chapter" is changed to "Chapter 335, Subchapter E of this title (relating to Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities) or Chapter 335, Subchapter F of this title (relating to Permitting Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities)";

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(III) in 40 CFR §261.38(c)(3) - (5), the references to "parts 264 and 265, or §262.34 of this chapter" are changed to "Chapter 335, Subchapter E of this title (relating to Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities) and Chapter 335, Subchapter F of this title (relating to Permitting Standards for Owners and Operators of Hazardous Waste Treatment, Storage, or Disposal Facilities), or §335.69 of this title (relating to Accumulation Time)";

(IV) in 40 CFR §261.38(c)(5), the reference to "§261.6(c) of this chapter" is changed to "§335.24 (e) and (f) of this title (relating to Requirements for Recyclable Materials and Nonhazardous Recyclable Materials)";

(V) in 40 CFR §261.38(c)(7), the references to "appropriate regulatory authority" and "regulatory authority" are changed to "executive director";

(VI) in 40 CFR §261.38(c)(8), the reference to "§262.11 of this chapter" is changed to "§335.62 of this title (relating to Hazardous Waste Determination and Waste Classification)";

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TITLE 30**ENVIRONMENTAL QUALITY****PART 1****TEXAS COMMISSION ON ENVIRONMENTAL QUALITY****CHAPTER 335****INDUSTRIAL SOLID WASTE AND MUNICIPAL
HAZARDOUS WASTE****SUBCHAPTER A****INDUSTRIAL SOLID WASTE AND MUNICIPAL
HAZARDOUS WASTE IN GENERAL****RULE §335.1****Definitions**

(VII) in 40 CFR §261.38(c)(9), the reference to "§261.2(c)(4) of this chapter" is changed to §335.1 (133)(D)(iv) " of this title (relating to Definitions)"; and

(VIII) in 40 CFR §261.38(c)(10), the reference to "implementing authority" is changed to "executive director."

(B) A discarded material is any material which is:

- (i) abandoned, as explained in subparagraph (C) of this paragraph;
- (ii) recycled, as explained in subparagraph (D) of this paragraph;
- (iii) considered inherently waste-like, as explained in subparagraph (E) of this paragraph; or
- (iv) a military munition identified as a solid waste in 40 CFR §266.202.

(C) Materials are solid wastes if they are abandoned by being:

- (i) disposed of;
- (ii) burned or incinerated; or
- (iii) accumulated, stored, or processed (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated.

(D) Except for materials described in subparagraph (H) of this paragraph, materials are solid wastes if they are "recycled" or accumulated, stored, or processed before recycling as specified in this subparagraph. The chart referred to as Table 1 indicates only which materials are considered to be solid wastes when they are recycled and is not intended to supersede the definition of solid waste provided in subparagraph (A) of this paragraph.

(i) Used in a manner constituting disposal. Materials noted with an asterisk in Column 1 of Table 1 are solid wastes when they are:

(I) applied to or placed on the land in a manner that constitutes disposal; or

(II) used to produce products that are applied to or placed on the land or are otherwise contained in

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products that are applied to or placed on the land (in which cases the product itself remains a solid waste). However, commercial chemical products listed in 40 CFR §261.33 are not solid wastes if they are applied to the land and that is their ordinary manner of use.

(ii) Burning for energy recovery. Materials noted with an asterisk in Column 2 of Table 1 are solid wastes when they are:

(I) burned to recover energy; or

(II) used to produce a fuel or are otherwise contained in fuels (in which cases the fuel itself remains a solid waste). However, commercial chemical products, which are listed in 40 CFR §261.33, not listed in §261.33, but that exhibit one or more of the hazardous waste characteristics, or will be considered nonhazardous waste if disposed, are not solid wastes if they are fuels themselves and burned for energy recovery.

(iii) Reclaimed. Materials noted with an asterisk in Column 3 of Table 1 are solid wastes when reclaimed (except as provided under 40 CFR §261.4(a)(17)). Materials without an asterisk in Column 3 of Table 1 are not solid wastes when reclaimed.

(iv) Accumulated speculatively. Materials noted with an asterisk in Column 4 of Table 1 are solid wastes when accumulated speculatively.

Attached Graphic

(E) Materials that are identified by the administrator of the EPA as inherently waste-like materials under 40 CFR §261.2(d) are solid wastes when they are recycled in any manner.

(F) Materials are not solid wastes when they can be shown to be recycled by being:

(i) used or reused as ingredients in an industrial process to make a product, provided the materials are not being reclaimed;

(ii) used or reused as effective substitutes for commercial products;

(iii) returned to the original process from which they were generated, without first being reclaimed or land disposed. The material must be returned as a substitute for feedstock materials. In cases where the original process to which the material is returned is a secondary process, the materials must be managed such that there is no placement on the land. In cases where the materials are generated and reclaimed within the primary mineral processing industry, the conditions of the exclusion found at 40 CFR §261.4(a)(17) apply rather than this provision; or

(iv) secondary materials that are reclaimed and returned to the original process or processes in which they were generated where they are reused in the production process provided:

(I) only tank storage is involved, and the entire process through completion of reclamation is closed by being entirely connected with pipes or other comparable enclosed means of conveyance;

(II) reclamation does not involve controlled flame combustion (such as occurs in boilers, industrial furnaces, or incinerators);

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(I) is a Class 3 waste under Subchapter R of this chapter (relating to Waste Classification), except for arsenic, cadmium, chromium, lead, mercury, nickel, selenium, and total dissolved solids; and

(II) for the metals listed in subclause (I) of this clause:

(-a-) is a Class 2 or Class 3 waste under Subchapter R of this chapter; and

(-b-) does not exceed a concentration limit under §312.43(b)(3), Table 3 of this title (relating to Metal Limits); and

(viii) with the exception of the requirements under §335.17(a)(8) of this title (relating to Special Definitions for Recyclable Materials and Nonhazardous Recyclable Materials):

(I) at least 75% (by weight or volume) of the annual production of the recycling material must be recycled or transferred to a different site and recycled on an annual basis; and

(II) if the recycling material is placed in protective storage, such as a silo or other protective enclosure, at least 75% (by weight or volume) of the annual production of the recycling material must be recycled or transferred to a different site and recycled on a biennial basis.

(I) Respondents in actions to enforce the industrial solid waste regulations who raise a claim that a certain material is not a solid waste, or is conditionally exempt from regulation, must demonstrate that there is a known market or disposition for the material, and that they meet the terms of the exclusion or exemption. In doing so, they must provide appropriate documentation (such as contracts showing that a second person uses the material as an ingredient in a production process) to demonstrate that the material is not a waste, or is exempt from regulation. In addition, owners or operators of facilities claiming that they actually are recycling materials must show that they have the necessary equipment to do so and that the recycling activity is legitimate and beneficial.

(J) Materials that are reclaimed from solid wastes and that are used beneficially are not solid wastes and hence are not hazardous wastes under 40 CFR §261.3(c) unless the reclaimed material is burned for energy recovery or used in a manner constituting disposal.

(K) Other portions of this chapter that relate to solid wastes that are recycled include §335.6 of this title (relating to Notification Requirements), §§335.17 - 335.19 of this title, §335.24 of this title (relating to Requirements for Recyclable Materials and Nonhazardous Recyclable Materials), and Subchapter H of this chapter (relating to Standards for the Management of Specific Wastes and Specific Types of Facilities).

(134) Sorbent--A material that is used to soak up free liquids by either adsorption or absorption, or both. Sorb means to either adsorb or absorb, or both.

(135) Spill--The accidental spilling, leaking, pumping, emitting, emptying, or dumping of solid waste or hazardous wastes or materials which, when spilled, become solid waste or hazardous wastes into or on any land or water.

(136) Staging pile--An accumulation of solid, non-flowing remediation waste, as defined in this section, that is not a containment building and that is used only during remedial operations for temporary storage at a facility. Staging piles must be designated by the executive director according to the requirements of 40 Code of Federal Regulations §264.554, as adopted by reference under §335.152

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e-CFRTM**e-CFR Data is current as of November 19, 2007****Title 40: Protection of Environment****PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE****Subpart A—General**[Browse Previous](#) | [Browse Next](#)**§ 261.2 Definition of solid waste.**

(a)(1) A *solid waste* is any discarded material that is not excluded by §261.4(a) or that is not excluded by variance granted under §§260.30 and 260.31.

(2) A *discarded material* is any material which is:

- (i) *Abandoned*, as explained in paragraph (b) of this section; or
- (ii) *Recycled*, as explained in paragraph (c) of this section; or
- (iii) Considered *inherently waste-like*, as explained in paragraph (d) of this section; or
- (iv) A *military munition* identified as a solid waste in 40 CFR 266.202.

(b) Materials are solid waste if they are *abandoned* by being:

- (1) Disposed of; or
- (2) Burned or incinerated; or
- (3) Accumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of, burned, or incinerated.

(c) Materials are solid wastes if they are *recycled* —or accumulated, stored, or treated before recycling— as specified in paragraphs (c)(1) through (4) of this section.

(1) *Used in a manner constituting disposal.* (i) Materials noted with a “*” in Column 1 of Table 1 are solid wastes when they are:

- (A) Applied to or placed on the land in a manner that constitutes disposal; or
- (B) Used to produce products that are applied to or placed on the land or are otherwise contained in products that are applied to or placed on the land (in which cases the product itself remains a solid waste).

(ii) However, commercial chemical products listed in §261.33 are not solid wastes if they are applied to the land and that is their ordinary manner of use.

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(2) *Burning for energy recovery.* (i) Materials noted with a "*" in column 2 of Table 1 are solid wastes when they are:

(A) Burned to recover energy;

(B) Used to produce a fuel or are otherwise contained in fuels (in which cases the fuel itself remains a solid waste).

(ii) However, commercial chemical products listed in §261.33 are not solid wastes if they are themselves fuels.

(3) *Reclaimed.* Materials noted with a "*" in column 3 of Table 1 are solid wastes when reclaimed (except as provided under §261.4(a)(17)). Materials noted with a "—" in column 3 of Table 1 are not solid wastes when reclaimed.

(4) *Accumulated speculatively.* Materials noted with a "*" in column 4 of Table 1 are solid wastes when accumulated speculatively.

Table 1

	Use constituting disposal (§261.2(c)(1))	Energy recovery/ fuel (§261.2(c) (2))	Reclamation (§261.2(c)(3)) (except as provided in 261.4(a)(17) for mineral processing secondary materials)	Speculative accumulation (§261.2(c)(4))
	1	2	3	4
Spent Materials	(*)	(*)	(*)	(*)
Sludges (listed in 40 CFR Part 261.31 or 261.32)	(*)	(*)	(*)	(*)
Sludges exhibiting a characteristic of hazardous waste	(*)	(*)	—	(*)
By-products (listed in 40 CFR 261.31 or 261.32)	(*)	(*)	(*)	(*)
By-products exhibiting a characteristic of hazardous waste	(*)	(*)	—	(*)
Commercial	(*)	(*)	—	—

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chemical products listed in 40 CFR 261.33				
Scrap metal other than excluded scrap metal (see 261.1(c)(9))	(*)	(*)	(*)	(*)

Note: The terms "spent materials," "sludges," "by-products," and "scrap metal" and "processed scrap metal" are defined in §261.1.

(d) *Inherently waste-like materials.* The following materials are solid wastes when they are recycled in any manner:

(1) Hazardous Waste Nos. F020, F021 (unless used as an ingredient to make a product at the site of generation), F022, F023, F026, and F028.

(2) Secondary materials fed to a halogen acid furnace that exhibit a characteristic of a hazardous waste or are listed as a hazardous waste as defined in subparts C or D of this part, except for brominated material that meets the following criteria:

(i) The material must contain a bromine concentration of at least 45%; and

(ii) The material must contain less than a total of 1% of toxic organic compounds listed in appendix VIII; and

(iii) The material is processed continually on-site in the halogen acid furnace via direct conveyance (hard piping).

(3) The Administrator will use the following criteria to add wastes to that list:

(i)(A) The materials are ordinarily disposed of, burned, or incinerated; or

(B) The materials contain toxic constituents listed in appendix VIII of part 261 and these constituents are not ordinarily found in raw materials or products for which the materials substitute (or are found in raw materials or products in smaller concentrations) and are not used or reused during the recycling process; and

(ii) The material may pose a substantial hazard to human health and the environment when recycled.

(e) *Materials that are not solid waste when recycled.* (1) Materials are not solid wastes when they can be shown to be recycled by being:

(i) Used or reused as ingredients in an industrial process to make a product, provided the materials are not being reclaimed; or

(ii) Used or reused as effective substitutes for commercial products; or

(iii) Returned to the original process from which they are generated, without first being reclaimed or land disposed. The material must be returned as a substitute for feedstock materials. In cases where the original process to which the material is returned is a secondary process, the materials must be managed such that there is no placement on the land. In cases where the materials are generated and reclaimed within the primary mineral processing industry, the conditions of the exclusion found at §261.4 (a)(17) apply rather than this paragraph.

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(2) The following materials are solid wastes, even if the recycling involves use, reuse, or return to the original process (described in paragraphs (e)(1) (i) through (iii) of this section):

(i) Materials used in a manner constituting disposal, or used to produce products that are applied to the land; or

(ii) Materials burned for energy recovery, used to produce a fuel, or contained in fuels; or

(iii) Materials accumulated speculatively; or

(iv) Materials listed in paragraphs (d)(1) and (d)(2) of this section.

(f) *Documentation of claims that materials are not solid wastes or are conditionally exempt from regulation.* Respondents in actions to enforce regulations implementing subtitle C of RCRA who raise a claim that a certain material is not a solid waste, or is conditionally exempt from regulation, must demonstrate that there is a known market or disposition for the material, and that they meet the terms of the exclusion or exemption. In doing so, they must provide appropriate documentation (such as contracts showing that a second person uses the material as an ingredient in a production process) to demonstrate that the material is not a waste, or is exempt from regulation. In addition, owners or operators of facilities claiming that they actually are recycling materials must show that they have the necessary equipment to do so.

[50 FR 664, Jan. 4, 1985, as amended at 50 FR 33542, Aug. 20, 1985; 56 FR 7206, Feb. 21, 1991; 56 FR 32688, July 17, 1991; 56 FR 42512, Aug. 27, 1991; 57 FR 38564, Aug. 25, 1992; 59 FR 48042, Sept. 19, 1994; 62 FR 6651, Feb. 12, 1997; 62 FR 26019, May 12, 1997; 63 FR 28636, May 26, 1998; 64 FR 24513, May 11, 1999; 67 FR 11253, Mar. 13, 2002; 71 FR 40258, July 14, 2006]

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e-CFRTM**e-CFR Data is current as of November 19, 2007****Title 40: Protection of Environment****PART 261—IDENTIFICATION AND LISTING OF HAZARDOUS WASTE****Subpart A—General**[Browse Previous](#) | [Browse Next](#)**§ 261.4 Exclusions.**

(a) *Materials which are not solid wastes.* The following materials are not solid wastes for the purpose of this part:

(1)(i) Domestic sewage; and

(ii) Any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly-owned treatment works for treatment. "Domestic sewage" means untreated sanitary wastes that pass through a sewer system.

(2) Industrial wastewater discharges that are point source discharges subject to regulation under section 402 of the Clean Water Act, as amended.

[*Comment:* This exclusion applies only to the actual point source discharge. It does not exclude industrial wastewaters while they are being collected, stored or treated before discharge, nor does it exclude sludges that are generated by industrial wastewater treatment.]

(3) Irrigation return flows.

(4) Source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011 *et seq.*

(5) Materials subjected to in-situ mining techniques which are not removed from the ground as part of the extraction process.

(6) Pulping liquors (*i.e.*, black liquor) that are reclaimed in a pulping liquor recovery furnace and then reused in the pulping process, unless it is accumulated speculatively as defined in §261.1(c) of this chapter.

(7) Spent sulfuric acid used to produce virgin sulfuric acid, unless it is accumulated speculatively as defined in §261.1(c) of this chapter.

(8) Secondary materials that are reclaimed and returned to the original process or processes in which they were generated where they are reused in the production process provided:

(i) Only tank storage is involved, and the entire process through completion of reclamation is closed by being entirely connected with pipes or other comparable enclosed means of conveyance;

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(ii) Reclamation does not involve controlled flame combustion (such as occurs in boilers, industrial furnaces, or incinerators);

(iii) The secondary materials are never accumulated in such tanks for over twelve months without being reclaimed; and

(iv) The reclaimed material is not used to produce a fuel, or used to produce products that are used in a manner constituting disposal.

(9)(i) Spent wood preserving solutions that have been reclaimed and are reused for their original intended purpose; and

(ii) Wastewaters from the wood preserving process that have been reclaimed and are reused to treat wood.

(iii) Prior to reuse, the wood preserving wastewaters and spent wood preserving solutions described in paragraphs (a)(9)(i) and (a)(9)(ii) of this section, so long as they meet all of the following conditions:

(A) The wood preserving wastewaters and spent wood preserving solutions are reused on-site at water borne plants in the production process for their original intended purpose;

(B) Prior to reuse, the wastewaters and spent wood preserving solutions are managed to prevent release to either land or groundwater or both;

(C) Any unit used to manage wastewaters and/or spent wood preserving solutions prior to reuse can be visually or otherwise determined to prevent such releases;

(D) Any drip pad used to manage the wastewaters and/or spent wood preserving solutions prior to reuse complies with the standards in part 265, subpart V of this chapter, regardless of whether the plant generates a total of less than 100 kg/month of hazardous waste; and

(E) Prior to operating pursuant to this exclusion, the plant owner or operator prepares a one-time notification stating that the plant intends to claim the exclusion, giving the date on which the plant intends to begin operating under the exclusion, and containing the following language: "I have read the applicable regulation establishing an exclusion for wood preserving wastewaters and spent wood preserving solutions and understand it requires me to comply at all times with the conditions set out in the regulation." The plant must maintain a copy of that document in its on-site records until closure of the facility. The exclusion applies so long as the plant meets all of the conditions. If the plant goes out of compliance with any condition, it may apply to the appropriate Regional Administrator or state Director for reinstatement. The Regional Administrator or state Director may reinstate the exclusion upon finding that the plant has returned to compliance with all conditions and that the violations are not likely to recur.

(10) EPA Hazardous Waste Nos. K060, K087, K141, K142, K143, K144, K145, K147, and K148, and any wastes from the coke by-products processes that are hazardous only because they exhibit the Toxicity Characteristic (TC) specified in section 261.24 of this part when, subsequent to generation, these materials are recycled to coke ovens, to the tar recovery process as a feedstock to produce coal tar, or mixed with coal tar prior to the tar's sale or refining. This exclusion is conditioned on there being no land disposal of the wastes from the point they are generated to the point they are recycled to coke ovens or tar recovery or refining processes, or mixed with coal tar.

(11) Nonwastewater splash condenser dross residue from the treatment of K061 in high temperature metals recovery units, provided it is shipped in drums (if shipped) and not land disposed before recovery.

(12) (i) Oil-bearing hazardous secondary materials (i.e., sludges, byproducts, or spent materials) that are generated at a petroleum refinery (SIC code 2911) and are inserted into the petroleum refining process (SIC code 2911—including, but not limited to, distillation, catalytic cracking, fractionation, or thermal cracking units (i.e., cokers)) unless the material is placed on the land, or speculatively accumulated before being so recycled. Materials inserted into thermal cracking units are excluded under this paragraph, provided that the coke product also does not exhibit a characteristic of hazardous waste. Oil-bearing hazardous secondary materials may be inserted into the same petroleum refinery where they

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are generated, or sent directly to another petroleum refinery, and still be excluded under this provision. Except as provided in paragraph (a)(12)(ii) of this section, oil-bearing hazardous secondary materials generated elsewhere in the petroleum industry (i.e., from sources other than petroleum refineries) are not excluded under this section. Residuals generated from processing or recycling materials excluded under this paragraph (a)(12)(i), where such materials as generated would have otherwise met a listing under subpart D of this part, are designated as F037 listed wastes when disposed of or intended for disposal.

(ii) Recovered oil that is recycled in the same manner and with the same conditions as described in paragraph (a)(12)(i) of this section. Recovered oil is oil that has been reclaimed from secondary materials (including wastewater) generated from normal petroleum industry practices, including refining, exploration and production, bulk storage, and transportation incident thereto (SIC codes 1311, 1321, 1381, 1382, 1389, 2911, 4612, 4613, 4922, 4923, 4789, 5171, and 5172.) Recovered oil does not include oil-bearing hazardous wastes listed in subpart D of this part; however, oil recovered from such wastes may be considered recovered oil. Recovered oil does not include used oil as defined in 40 CFR 279.1.

(13) Excluded scrap metal (processed scrap metal, unprocessed home scrap metal, and unprocessed prompt scrap metal) being recycled.

(14) Shredded circuit boards being recycled provided that they are:

(i) Stored in containers sufficient to prevent a release to the environment prior to recovery; and

(ii) Free of mercury switches, mercury relays and nickel-cadmium batteries and lithium batteries.

(15) Condensates derived from the overhead gases from kraft mill steam strippers that are used to comply with 40 CFR 63.446(e). The exemption applies only to combustion at the mill generating the condensates.

(16) Comparable fuels or comparable syngas fuels (i.e., comparable/syngas fuels) that meet the requirements of §261.38.

(17) Spent materials (as defined in §261.1) (other than hazardous wastes listed in subpart D of this part) generated within the primary mineral processing industry from which minerals, acids, cyanide, water, or other values are recovered by mineral processing or by beneficiation, provided that:

(i) The spent material is legitimately recycled to recover minerals, acids, cyanide, water or other values;

(ii) The spent material is not accumulated speculatively;

(iii) Except as provided in paragraph (a)(17)(iv) of this section, the spent material is stored in tanks, containers, or buildings meeting the following minimum integrity standards: a building must be an engineered structure with a floor, walls, and a roof all of which are made of non-earthen materials providing structural support (except smelter buildings may have partially earthen floors provided the secondary material is stored on the non-earthen portion), and have a roof suitable for diverting rainwater away from the foundation; a tank must be free standing, not be a surface impoundment (as defined in 40 CFR 260.10), and be manufactured of a material suitable for containment of its contents; a container must be free standing and be manufactured of a material suitable for containment of its contents. If tanks or containers contain any particulate which may be subject to wind dispersal, the owner/operator must operate these units in a manner which controls fugitive dust. Tanks, containers, and buildings must be designed, constructed and operated to prevent significant releases to the environment of these materials.

(iv) The Regional Administrator or State Director may make a site-specific determination, after public review and comment, that only solid mineral processing spent material may be placed on pads rather than tanks containers, or buildings. Solid mineral processing spent materials do not contain any free liquid. The decision-maker must affirm that pads are designed, constructed and operated to prevent significant releases of the secondary material into the environment. Pads must provide the same degree of containment afforded by the non-RCRA tanks, containers and buildings eligible for exclusion.

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(A) The decision-maker must also consider if storage on pads poses the potential for significant releases via groundwater, surface water, and air exposure pathways. Factors to be considered for assessing the groundwater, surface water, air exposure pathways are: The volume and physical and chemical properties of the secondary material, including its potential for migration off the pad; the potential for human or environmental exposure to hazardous constituents migrating from the pad via each exposure pathway, and the possibility and extent of harm to human and environmental receptors via each exposure pathway.

(B) Pads must meet the following minimum standards: Be designed of non-earthen material that is compatible with the chemical nature of the mineral processing spent material, capable of withstanding physical stresses associated with placement and removal, have run on/runoff controls, be operated in a manner which controls fugitive dust, and have integrity assurance through inspections and maintenance programs.

(C) Before making a determination under this paragraph, the Regional Administrator or State Director must provide notice and the opportunity for comment to all persons potentially interested in the determination. This can be accomplished by placing notice of this action in major local newspapers, or broadcasting notice over local radio stations.

(v) The owner or operator provides notice to the Regional Administrator or State Director providing the following information: The types of materials to be recycled; the type and location of the storage units and recycling processes; and the annual quantities expected to be placed in land-based units. This notification must be updated when there is a change in the type of materials recycled or the location of the recycling process.

(vi) For purposes of paragraph (a)(7) of this section, mineral processing spent materials must be the result of mineral processing and may not include any listed hazardous wastes. Listed hazardous wastes and characteristic hazardous wastes generated by non-mineral processing industries are not eligible for the conditional exclusion from the definition of solid waste.

(18) Petrochemical recovered oil from an associated organic chemical manufacturing facility, where the oil is to be inserted into the petroleum refining process (SIC code 2911) along with normal petroleum refinery process streams, provided:

(i) The oil is hazardous only because it exhibits the characteristic of ignitability (as defined in §261.21) and/or toxicity for benzene (§261.24, waste code D018); and

(ii) The oil generated by the organic chemical manufacturing facility is not placed on the land, or speculatively accumulated before being recycled into the petroleum refining process. An "associated organic chemical manufacturing facility" is a facility where the primary SIC code is 2869, but where operations may also include SIC codes 2821, 2822, and 2865; and is physically co-located with a petroleum refinery; and where the petroleum refinery to which the oil being recycled is returned also provides hydrocarbon feedstocks to the organic chemical manufacturing facility. "Petrochemical recovered oil" is oil that has been reclaimed from secondary materials (i.e., sludges, byproducts, or spent materials, including wastewater) from normal organic chemical manufacturing operations, as well as oil recovered from organic chemical manufacturing processes.

(19) Spent caustic solutions from petroleum refining liquid treating processes used as a feedstock to produce cresylic or naphthenic acid unless the material is placed on the land, or accumulated speculatively as defined in §261.1(c).

(20) Hazardous secondary materials used to make zinc fertilizers, provided that the following conditions specified are satisfied:

(i) Hazardous secondary materials used to make zinc micronutrient fertilizers must not be accumulated speculatively, as defined in §261.1 (c)(8).

(ii) Generators and intermediate handlers of zinc-bearing hazardous secondary materials that are to be incorporated into zinc fertilizers must:

(A) Submit a one-time notice to the Regional Administrator or State Director in whose jurisdiction the

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(v) Interim status and permitted storage units that have been used to store only zinc-bearing hazardous wastes prior to the submission of the one-time notice described in paragraph (a)(20)(ii)(A) of this section, and that afterward will be used only to store hazardous secondary materials excluded under this paragraph, are not subject to the closure requirements of 40 CFR Parts 264 and 265.

(21) Zinc fertilizers made from hazardous wastes, or hazardous secondary materials that are excluded under paragraph (a)(20) of this section, provided that:

(i) The fertilizers meet the following contaminant limits:

(A) For metal contaminants:

Constituent	Maximum Allowable Total Concentration in Fertilizer, per Unit (1%) of Zinc (ppm)
Arsenic	0.3
Cadmium	1.4
Chromium	0.6
Lead	2.8
Mercury	0.3

(B) For dioxin contaminants the fertilizer must contain no more than eight (8) parts per trillion of dioxin, measured as toxic equivalent (TEQ).

(ii) The manufacturer performs sampling and analysis of the fertilizer product to determine compliance with the contaminant limits for metals no less than every six months, and for dioxins no less than every twelve months. Testing must also be performed whenever changes occur to manufacturing processes or ingredients that could significantly affect the amounts of contaminants in the fertilizer product. The manufacturer may use any reliable analytical method to demonstrate that no constituent of concern is present in the product at concentrations above the applicable limits. It is the responsibility of the manufacturer to ensure that the sampling and analysis are unbiased, precise, and representative of the product(s) introduced into commerce.

(iii) The manufacturer maintains for no less than three years records of all sampling and analyses performed for purposes of determining compliance with the requirements of paragraph (a)(21)(ii) of this section. Such records must at a minimum include:

(A) The dates and times product samples were taken, and the dates the samples were analyzed;

(B) The names and qualifications of the person(s) taking the samples;

(C) A description of the methods and equipment used to take the samples;

(D) The name and address of the laboratory facility at which analyses of the samples were performed;

(E) A description of the analytical methods used, including any cleanup and sample preparation methods; and

(F) All laboratory analytical results used to determine compliance with the contaminant limits specified in this paragraph (a)(21).

(22) Used cathode ray tubes (CRTs)

(i) Used, intact CRTs as defined in §260.10 of this chapter are not solid wastes within the United States unless they are disposed, or unless they are speculatively accumulated as defined in §261.1(c)(8) by CRT collectors or glass processors.

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(ii) Used, intact CRTs as defined in §260.10 of this chapter are not solid wastes when exported for recycling provided that they meet the requirements of §261.40.

(iii) Used, broken CRTs as defined in §260.10 of this chapter are not solid wastes provided that they meet the requirements of §261.39.

(iv) Glass removed from CRTs is not a solid waste provided that it meets the requirements of §261.39 (c).

(b) *Solid wastes which are not hazardous wastes.* The following solid wastes are not hazardous wastes:

(1) Household waste, including household waste that has been collected, transported, stored, treated, disposed, recovered (e.g., refuse-derived fuel) or reused. "Household waste" means any material (including garbage, trash and sanitary wastes in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas). A resource recovery facility managing municipal solid waste shall not be deemed to be treating, storing, disposing of, or otherwise managing hazardous wastes for the purposes of regulation under this subtitle, if such facility:

(i) Receives and burns only

(A) Household waste (from single and multiple dwellings, hotels, motels, and other residential sources) and

(B) Solid waste from commercial or industrial sources that does not contain hazardous waste; and

(ii) Such facility does not accept hazardous wastes and the owner or operator of such facility has established contractual requirements or other appropriate notification or inspection procedures to assure that hazardous wastes are not received at or burned in such facility.

(2) Solid wastes generated by any of the following and which are returned to the soils as fertilizers:

(i) The growing and harvesting of agricultural crops.

(ii) The raising of animals, including animal manures.

(3) Mining overburden returned to the mine site.

(4) Fly ash waste, bottom ash waste, slag waste, and flue gas emission control waste, generated primarily from the combustion of coal or other fossil fuels, except as provided by §266.112 of this chapter for facilities that burn or process hazardous waste.

(5) Drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy.

(6)(i) Wastes which fail the test for the Toxicity Characteristic because chromium is present or are listed in subpart D due to the presence of chromium, which do not fail the test for the Toxicity Characteristic for any other constituent or are not listed due to the presence of any other constituent, and which do not fail the test for any other characteristic, if it is shown by a waste generator or by waste generators that:

(A) The chromium in the waste is exclusively (or nearly exclusively) trivalent chromium; and

(B) The waste is generated from an industrial process which uses trivalent chromium exclusively (or nearly exclusively) and the process does not generate hexavalent chromium; and

(C) The waste is typically and frequently managed in non-oxidizing environments.

(ii) Specific wastes which meet the standard in paragraphs (b)(6)(i) (A), (B), and (C) (so long as they do

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not fail the test for the toxicity characteristic for any other constituent, and do not exhibit any other characteristic) are:

(A) Chrome (blue) trimmings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

(B) Chrome (blue) shavings generated by the following subcategories of the leather tanning and finishing industry: Hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

(C) Buffing dust generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue.

(D) Sewer screenings generated by the following subcategories of the leather tanning and finishing industry: Hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

(E) Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: Hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.

(F) Wastewater treatment sludges generated by the following subcategories of the leather tanning and finishing industry: Hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; and through-the-blue.

(G) Waste scrap leather from the leather tanning industry, the shoe manufacturing industry, and other leather product manufacturing industries.

(H) Wastewater treatment sludges from the production of TiO_2 pigment using chromium-bearing ores by the chloride process.

(7) Solid waste from the extraction, beneficiation, and processing of ores and minerals (including coal, phosphate rock, and overburden from the mining of uranium ore), except as provided by §266.112 of this chapter for facilities that burn or process hazardous waste.

(i) For purposes of §261.4(b)(7) beneficiation of ores and minerals is restricted to the following activities; crushing; grinding; washing; dissolution; crystallization; filtration; sorting; sizing; drying; sintering; pelletizing; briquetting; calcining to remove water and/or carbon dioxide; roasting, autoclaving, and/or chlorination in preparation for leaching (except where the roasting (and/or autoclaving and/or chlorination)/leaching sequence produces a final or intermediate product that does not undergo further beneficiation or processing); gravity concentration; magnetic separation; electrostatic separation; flotation; ion exchange; solvent extraction; electrowinning; precipitation; amalgamation; and heap, dump, vat, tank, and in situ leaching.

(ii) For the purposes of §261.4(b)(7), solid waste from the processing of ores and minerals includes only the following wastes as generated:

(A) Slag from primary copper processing;

(B) Slag from primary lead processing;

(C) Red and brown muds from bauxite refining;

(D) Phosphogypsum from phosphoric acid production;

(E) Slag from elemental phosphorus production;

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- (F) Gasifier ash from coal gasification;
 - (G) Process wastewater from coal gasification;
 - (H) Calcium sulfate wastewater treatment plant sludge from primary copper processing;
 - (I) Slag tailings from primary copper processing;
 - (J) Fluorogypsum from hydrofluoric acid production;
 - (K) Process wastewater from hydrofluoric acid production;
 - (L) Air pollution control dust/sludge from iron blast furnaces;
 - (M) Iron blast furnace slag;
 - (N) Treated residue from roasting/leaching of chrome ore;
 - (O) Process wastewater from primary magnesium processing by the anhydrous process;
 - (P) Process wastewater from phosphoric acid production;
 - (Q) Basic oxygen furnace and open hearth furnace air pollution control dust/sludge from carbon steel production;
 - (R) Basic oxygen furnace and open hearth furnace slag from carbon steel production;
 - (S) Chloride process waste solids from titanium tetrachloride production;
 - (T) Slag from primary zinc processing.
- (iii) A residue derived from co-processing mineral processing secondary materials with normal beneficiation raw materials or with normal mineral processing raw materials remains excluded under paragraph (b) of this section if the owner or operator:
- (A) Processes at least 50 percent by weight normal beneficiation raw materials or normal mineral processing raw materials; and,
 - (B) Legitimately reclaims the secondary mineral processing materials.
- (8) Cement kiln dust waste, except as provided by §266.112 of this chapter for facilities that burn or process hazardous waste.
- (9) Solid waste which consists of discarded arsenical-treated wood or wood products which fails the test for the Toxicity Characteristic for Hazardous Waste Codes D004 through D017 and which is not a hazardous waste for any other reason if the waste is generated by persons who utilize the arsenical-treated wood and wood products for these materials' intended end use.
- (10) Petroleum-contaminated media and debris that fail the test for the Toxicity Characteristic of §261.24 (Hazardous Waste Codes D018 through D043 only) and are subject to the corrective action regulations under part 280 of this chapter.
- (11) Injected groundwater that is hazardous only because it exhibits the Toxicity Characteristic (Hazardous Waste Codes D018 through D043 only) in §261.24 of this part that is reinjected through an underground injection well pursuant to free phase hydrocarbon recovery operations undertaken at petroleum refineries, petroleum marketing terminals, petroleum bulk plants, petroleum pipelines, and petroleum transportation spill sites until January 25, 1993. This extension applies to recovery operations in existence, or for which contracts have been issued, on or before March 25, 1991. For groundwater

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returned through infiltration galleries from such operations at petroleum refineries, marketing terminals, and bulk plants, until [insert date six months after publication]. New operations involving injection wells (beginning after March 25, 1991) will qualify for this compliance date extension (until January 25, 1993) only if:

(i) Operations are performed pursuant to a written state agreement that includes a provision to assess the groundwater and the need for further remediation once the free phase recovery is completed; and

(ii) A copy of the written agreement has been submitted to: Waste Identification Branch (5304), U.S. Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460.

(12) Used chlorofluorocarbon refrigerants from totally enclosed heat transfer equipment, including mobile air conditioning systems, mobile refrigeration, and commercial and industrial air conditioning and refrigeration systems that use chlorofluorocarbons as the heat transfer fluid in a refrigeration cycle, provided the refrigerant is reclaimed for further use.

(13) Non-terme plated used oil filters that are not mixed with wastes listed in subpart D of this part if these oil filters have been gravity hot-drained using one of the following methods:

(i) Puncturing the filter anti-drain back valve or the filter dome end and hot-draining;

(ii) Hot-draining and crushing;

(iii) Dismantling and hot-draining; or

(iv) Any other equivalent hot-draining method that will remove used oil.

(14) Used oil re-refining distillation bottoms that are used as feedstock to manufacture asphalt products.

(15) Leachate or gas condensate collected from landfills where certain solid wastes have been disposed, provided that:

(i) The solid wastes disposed would meet one or more of the listing descriptions for Hazardous Waste Codes K169, K170, K171, K172, K174, K175, K176, K177, K178 and K181 if these wastes had been generated after the effective date of the listing;

(ii) The solid wastes described in paragraph (b)(15)(i) of this section were disposed prior to the effective date of the listing;

(iii) The leachate or gas condensate do not exhibit any characteristic of hazardous waste nor are derived from any other listed hazardous waste;

(iv) Discharge of the leachate or gas condensate, including leachate or gas condensate transferred from the landfill to a POTW by truck, rail, or dedicated pipe, is subject to regulation under sections 307(b) or 402 of the Clean Water Act.

(v) As of February 13, 2001, leachate or gas condensate derived from K169–K172 is no longer exempt if it is stored or managed in a surface impoundment prior to discharge. As of November 21, 2003, leachate or gas condensate derived from K176, K177, and K178 is no longer exempt if it is stored or managed in a surface impoundment prior to discharge. After February 26, 2007, leachate or gas condensate derived from K181 will no longer be exempt if it is stored or managed in a surface impoundment prior to discharge. There is one exception: if the surface impoundment is used to temporarily store leachate or gas condensate in response to an emergency situation (e.g., shutdown of wastewater treatment system), provided the impoundment has a double liner, and provided the leachate or gas condensate is removed from the impoundment and continues to be managed in compliance with the conditions of this paragraph (b)(15)(v) after the emergency ends.

(16) Sludges resulting from the treatment of wastewaters (not including spent plating solutions) generated by the copper metallization process at the International Business Machines Corporation (IBM) semiconductor manufacturing facility in Essex Junction, VT, are exempt from the F006 listing, provided

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(A) By-product gas generants must only be fed to the MRF when it is operating in conformance with the State of Utah, Division of Air Quality's Approval Order DAQE-549-97.

(B) Combustion gas temperature must be maintained below 400 degrees Fahrenheit at the baghouse inlet.

(ii) Prior to processing in the MRF, the by-product gas generants are managed in accordance with the requirements specified in 40 CFR 262.34.

(iii) The Autoliv facility and the MRF are operated and managed in accordance with the requirements of 40 CFR Part 265, Subparts B, C, D, E, G, H, I, and O.

(iv) Residues derived from the processing of by-product gas generants in the MRF are managed in accordance with the requirements specified in 40 CFR Parts 262 and 268.

(v) The following testing of the MRF's stack gas emissions is conducted:

(A) An initial test shall be conducted within 30 operating days of starting feed of by-product gas generants to the MRF. EPA may extend this deadline, at the request of Autoliv, when good cause is shown. The initial test shall consist of three duplicate runs sampling for:

(1) Particulate matter using Method 5 as specified in 40 CFR Part 60, Appendix A.

(2) The metals Aluminum, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, and Nickel using Method 29 as specified in 40 CFR Part 60, Appendix A.

(3) Polychlorinated di-benzo dioxins and furans using Method 23 0023A as specified in 40 CFR Part 60, Appendix A.

(4) Carbon monoxide using Method 10 as specified in 40 CFR Part 60, Appendix A.

(B) After the initial test is completed, an annual stack test (12 months from the previous initial stack test) of the MRF shall be conducted. The annual tests shall consist of three duplicate runs using Method 29 and Method 5 as specified in 40 CFR Part 60, Appendix A.

(C) Testing shall be conducted while by-product gas generants are fed to the MRF at no less than 90% of the planned maximum feed rate, and with the MRF operating parameters within normal ranges.

(D) Initial stack testing results and additional project performance data and information, including the quantity of by-product gas generants processed and the operating parameter values during the test runs, will be submitted by Autoliv to the State of Utah and EPA within 60 days of the completion of the initial stack test.

(E) Annual stack test results and additional project performance data and information, including the quantity of by-product gas generants processed and the operating parameter values during the test runs, will be submitted by Autoliv to EPA and the State of Utah within 60 days of the completion of the annual test.

(vi) Combustion gas discharged to the atmosphere from the MRF meets the following limits:

(A) Dioxin emissions do not exceed 0.4 ng per dry standard cubic meter on a toxicity equivalent quotient (TEQ) basis corrected to 7% Oxygen.

(B) Combined lead and cadmium emissions do not exceed 240 ug per dry standard cubic meter corrected to 7% Oxygen.

(C) Combined arsenic, beryllium, and chromium emissions do not exceed 97 ug per dry standard cubic meter corrected to 7% Oxygen.

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vessel, a product or raw material pipeline, or in a manufacturing process unit or an associated non-waste-treatment-manufacturing unit, is not subject to regulation under parts 262 through 265, 268, 270, 271 and 124 of this chapter or to the notification requirements of section 3010 of RCRA until it exits the unit in which it was generated, unless the unit is a surface impoundment, or unless the hazardous waste remains in the unit more than 90 days after the unit ceases to be operated for manufacturing, or for storage or transportation of product or raw materials.

(d) *Samples.* (1) Except as provided in paragraph (d)(2) of this section, a sample of solid waste or a sample of water, soil, or air, which is collected for the sole purpose of testing to determine its characteristics or composition, is not subject to any requirements of this part or parts 262 through 268 or part 270 or part 124 of this chapter or to the notification requirements of section 3010 of RCRA, when:

- (i) The sample is being transported to a laboratory for the purpose of testing; or
- (ii) The sample is being transported back to the sample collector after testing; or
- (iii) The sample is being stored by the sample collector before transport to a laboratory for testing; or
- (iv) The sample is being stored in a laboratory before testing; or
- (v) The sample is being stored in a laboratory after testing but before it is returned to the sample collector; or
- (vi) The sample is being stored temporarily in the laboratory after testing for a specific purpose (for example, until conclusion of a court case or enforcement action where further testing of the sample may be necessary).

(2) In order to qualify for the exemption in paragraphs (d)(1) (i) and (ii) of this section, a sample collector shipping samples to a laboratory and a laboratory returning samples to a sample collector must:

- (i) Comply with U.S. Department of Transportation (DOT), U.S. Postal Service (USPS), or any other applicable shipping requirements; or
- (ii) Comply with the following requirements if the sample collector determines that DOT, USPS, or other shipping requirements do not apply to the shipment of the sample:

(A) Assure that the following information accompanies the sample:

- (1) The sample collector's name, mailing address, and telephone number;
- (2) The laboratory's name, mailing address, and telephone number;
- (3) The quantity of the sample;
- (4) The date of shipment; and
- (5) A description of the sample.

(B) Package the sample so that it does not leak, spill, or vaporize from its packaging.

(3) This exemption does not apply if the laboratory determines that the waste is hazardous but the laboratory is no longer meeting any of the conditions stated in paragraph (d)(1) of this section.

(e) *Treatability Study Samples.* (1) Except as provided in paragraph (e)(2) of this section, persons who generate or collect samples for the purpose of conducting treatability studies as defined in section 260.10, are not subject to any requirement of parts 261 through 263 of this chapter or to the notification requirements of Section 3010 of RCRA, nor are such samples included in the quantity determinations of §261.5 and §262.34(d) when:

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(4) Whether or not unused samples and residues were returned to the generator.

(vi) The generator reports the information required under paragraph (e)(2)(v)(C) of this section in its biennial report.

(3) The Regional Administrator may grant requests on a case-by-case basis for up to an additional two years for treatability studies involving bioremediation. The Regional Administrator may grant requests on a case-by-case basis for quantity limits in excess of those specified in paragraphs (e)(2) (i) and (ii) and (f)(4) of this section, for up to an additional 5000 kg of media contaminated with non-acute hazardous waste, 500 kg of non-acute hazardous waste, 2500 kg of media contaminated with acute hazardous waste and 1 kg of acute hazardous waste:

(i) In response to requests for authorization to ship, store and conduct treatability studies on additional quantities in advance of commencing treatability studies. Factors to be considered in reviewing such requests include the nature of the technology, the type of process (e.g., batch versus continuous), size of the unit undergoing testing (particularly in relation to scale-up considerations), the time/quantity of material required to reach steady state operating conditions, or test design considerations such as mass balance calculations.

(ii) In response to requests for authorization to ship, store and conduct treatability studies on additional quantities after initiation or completion of initial treatability studies, when: There has been an equipment or mechanical failure during the conduct of a treatability study; there is a need to verify the results of a previously conducted treatability study; there is a need to study and analyze alternative techniques within a previously evaluated treatment process; or there is a need to do further evaluation of an ongoing treatability study to determine final specifications for treatment.

(iii) The additional quantities and timeframes allowed in paragraph (e)(3) (i) and (ii) of this section are subject to all the provisions in paragraphs (e) (1) and (e)(2) (iii) through (vi) of this section. The generator or sample collector must apply to the Regional Administrator in the Region where the sample is collected and provide in writing the following information:

(A) The reason why the generator or sample collector requires additional time or quantity of sample for treatability study evaluation and the additional time or quantity needed;

(B) Documentation accounting for all samples of hazardous waste from the waste stream which have been sent for or undergone treatability studies including the date each previous sample from the waste stream was shipped, the quantity of each previous shipment, the laboratory or testing facility to which it was shipped, what treatability study processes were conducted on each sample shipped, and the available results on each treatability study;

(C) A description of the technical modifications or change in specifications which will be evaluated and the expected results;

(D) If such further study is being required due to equipment or mechanical failure, the applicant must include information regarding the reason for the failure or breakdown and also include what procedures or equipment improvements have been made to protect against further breakdowns; and

(E) Such other information that the Regional Administrator considers necessary.

(f) *Samples Undergoing Treatability Studies at Laboratories and Testing Facilities.* Samples undergoing treatability studies and the laboratory or testing facility conducting such treatability studies (to the extent such facilities are not otherwise subject to RCRA requirements) are not subject to any requirement of this part, part 124, parts 262–266, 268, and 270, or to the notification requirements of Section 3010 of RCRA provided that the conditions of paragraphs (f) (1) through (11) of this section are met. A mobile treatment unit (MTU) may qualify as a testing facility subject to paragraphs (f) (1) through (11) of this section. Where a group of MTUs are located at the same site, the limitations specified in (f) (1) through (11) of this section apply to the entire group of MTUs collectively as if the group were one MTU.

(1) No less than 45 days before conducting treatability studies, the facility notifies the Regional Administrator, or State Director (if located in an authorized State), in writing that it intends to conduct treatability studies under this paragraph.

Q2

identification numbers);

(iv) The total quantity of waste in storage each day;

(v) The quantity and types of waste subjected to treatability studies;

(vi) When each treatability study was conducted;

(vii) The final disposition of residues and unused sample from each treatability study.

(10) The facility determines whether any unused sample or residues generated by the treatability study are hazardous waste under §261.3 and, if so, are subject to parts 261 through 268, and part 270 of this chapter, unless the residues and unused samples are returned to the sample originator under the §261.4(e) exemption.

(11) The facility notifies the Regional Administrator, or State Director (if located in an authorized State), by letter when the facility is no longer planning to conduct any treatability studies at the site.

(g) *Dredged material that is not a hazardous waste.* Dredged material that is subject to the requirements of a permit that has been issued under 404 of the Federal Water Pollution Control Act (33 U.S.C. 1344) or section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. 1413) is not a hazardous waste. For this paragraph (g), the following definitions apply:

(1) The term *dredged material* has the same meaning as defined in 40 CFR 232.2;

(2) The term *permit* means:

(i) A permit issued by the U.S. Army Corps of Engineers (Corps) or an approved State under section 404 of the Federal Water Pollution Control Act (33 U.S.C. 1344);

(ii) A permit issued by the Corps under section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (33 U.S.C. 1413); or

(iii) In the case of Corps civil works projects, the administrative equivalent of the permits referred to in paragraphs (g)(2)(i) and (ii) of this section, as provided for in Corps regulations (for example, see 33 CFR 336.1, 336.2, and 337.6).

[45 FR 33119, May 19, 1980]

Editorial Note: For Federal Register citations affecting §261.4, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and on GPO Access.

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facility designated by the person initiating the shipment.

(ii) Scrap metal that is not excluded under §261.4(a)(13);

(iii) Fuels produced from the refining of oil-bearing hazardous waste along with normal process streams at a petroleum refining facility if such wastes result from normal petroleum refining, production, and transportation practices (this exemption does not apply to fuels produced from oil recovered from oil-bearing hazardous waste, where such recovered oil is already excluded under §261.4(a)(12);

(iv)(A) Hazardous waste fuel produced from oil-bearing hazardous wastes from petroleum refining, production, or transportation practices, or produced from oil reclaimed from such hazardous wastes, where such hazardous wastes are reintroduced into a process that does not use distillation or does not produce products from crude oil so long as the resulting fuel meets the used oil specification under §279.11 of this chapter and so long as no other hazardous wastes are used to produce the hazardous waste fuel;

(B) Hazardous waste fuel produced from oil-bearing hazardous waste from petroleum refining production, and transportation practices, where such hazardous wastes are reintroduced into a refining process after a point at which contaminants are removed, so long as the fuel meets the used oil fuel specification under §279.11 of this chapter; and

(C) Oil reclaimed from oil-bearing hazardous wastes from petroleum refining, production, and transportation practices, which reclaimed oil is burned as a fuel without reintroduction to a refining process, so long as the reclaimed oil meets the used oil fuel specification under §279.11 of this chapter.

(4) Used oil that is recycled and is also a hazardous waste solely because it exhibits a hazardous characteristic is not subject to the requirements of parts 260 through 268 of this chapter, but is regulated under part 279 of this chapter. Used oil that is recycled includes any used oil which is reused, following its original use, for any purpose (including the purpose for which the oil was originally used). Such term includes, but is not limited to, oil which is re-refined, reclaimed, burned for energy recovery, or reprocessed.

(5) Hazardous waste that is exported to or imported from designated member countries of the Organization for Economic Cooperation and Development (OECD) (as defined in §262.58(a)(1)) for purpose of recovery is subject to the requirements of 40 CFR part 262, subpart H, if it is subject to either the Federal manifesting requirements of 40 CFR Part 262, to the universal waste management standards of 40 CFR Part 273, or to State requirements analogous to 40 CFR Part 273.

(b) Generators and transporters of recyclable materials are subject to the applicable requirements of parts 262 and 263 of this chapter and the notification requirements under section 3010 of RCRA, except as provided in paragraph (a) of this section.

(c)(1) Owners and operators of facilities that store recyclable materials before they are recycled are regulated under all applicable provisions of subparts A through L, AA, BB, and CC of parts 264 and 265, and under parts 124, 266, 268, and 270 of this chapter and the notification requirements under section 3010 of RCRA, except as provided in paragraph (a) of this section. (The recycling process itself is exempt from regulation except as provided in §261.6(d).)

(2) Owners or operators of facilities that recycle recyclable materials without storing them before they are recycled are subject to the following requirements, except as provided in paragraph (a) of this section:

(i) Notification requirements under section 3010 of RCRA;

(ii) Sections 265.71 and 265.72 (dealing with the use of the manifest and manifest discrepancies) of this chapter.

(iii) Section 261.6(d) of this chapter.

(d) Owners or operators of facilities subject to RCRA permitting requirements with hazardous waste management units that recycle hazardous wastes are subject to the requirements of subparts AA and

Attachment "C"

RASGAS

Tender Response Requirements

Question 6

Detailed Description of Technical Support

Miles Root

(b) (6)



SUMMARY OF QUALIFICATIONS

Senior level Technical Professional with extensive experience in laboratory management, experimental design, methods development, and troubleshooting of various chemical plant processes, analytical processes, and business systems to achieve continuous improvement in operational, quality, safety & environmental excellence. This experience includes direct process support to plant systems such as distillation, ion exchange, CEMS, heat exchange, blending, boilers, and deep well injection systems; analytical development of systems such as GC/MS, HPLC, and XRF; and laboratory management of personnel.

EDUCATION

1974 B.S. Chemistry Northern Illinois University

PROFESSIONAL EXPERIENCE

Merisol USA/Merichem Houston, TX

A specialty chemical manufacturer of phenolics, cresylic acids, and related chemicals.

1997-2007: Senior Chemist, Production Support
1980-1997: Section Leader, Raw Materials Laboratory
1976-1980 Chemist, Sales Support
1974-1976 Chemist, Quality Control Laboratory

Senior Chemist, Production Support

- Senior Chemist responsible for all plant process support and troubleshooting involving current production, new process development and quality improvement for a specialty chemical manufacturer of cresylic acids.
- Developed critical GC/MS methods to support new plant feedstock based upon coal vs. current petroleum refining processes. Performed GC/MS profile studies of all new feed stocks and plant production runs within critical time frame during plant transition.

De

- Performed customer support function of non-routine testing to include experimental design, implementation and processing recommendations.
- Managed air and water environmental quality systems including CEMS, NESHAP and discharge water TCEQ reporting. Designed and installed odor control system for plant site. Designed and implemented deep well injection system improvements.
- Developed processing and waste handling plans over a period of 22 months for hazardous waste materials resulting from the cleaning and decontamination of 50 chemical storage tanks during plant feed stock transition.
- Designed and implemented testing to evaluate and recommend all PPE for plant.
- Designed and implemented experimentation resulting in construction of high purity storage tank for freezable product saving \$250K per year in outside storage costs.
- Extensive experience with GC, GC/MS, HPLC, UV/VIS, XRF and numerous other sulfur techniques, titration systems, flame photometer, Oldershaw and other distillation methods and a wide variety of ASTM methods.

Section Leader, Raw Materials Testing Laboratory

- Managed 2-6 chemists. Responsible for all hiring, firing, training, development, safety and record keeping functions.
- Managed laboratory responsible for testing of all incoming feed stock which included UV/VIS, combustion, XRF and potentiometric sulfur techniques, and a wide variety of wet chemical methods and GC analysis.
- Evaluated supplier refinery process streams associated with the cresylic acid business, including various spent caustic and naphtha streams, to maximize recovery of cresylics at lowest cost. Included working with various refineries world wide on implementing numerous analytical testing methods.
- Implemented SPC, Metrics and ISO programs in section to maximize quality and continuous improvement goals.

Chemist, Sales Support

- Customer support, sample preparation and testing for customer needs.
- Performed a variety of wet chemical test methods, interface with sales and customer service to provide samples per specifications.

Chemist, Quality Control Laboratory

- Progression from senior analyst to Chemist.
- Performed routine tests in quality control laboratory on a rotating shift basis.
- Extensive use of GC and wet chemical tests.

References

Will be provided upon request.

ENGINEERING & TECHNICAL SUPPORT

CGH Associates

February 2005

(b) (6)

EXPERIENCE SYNOPSIS

NAME: Clark G. Hickman

PERSONAL:

Age:
Height:
Weight:

(b) (6)

EDUCATION:

B.S. Chemical Engineering (May 1970)
West Virginia Institute of Technology, Montgomery, West Virginia

M.S. Chemical Engineering (December 1974)
West Virginia University, Morgantown, West Virginia

PROFESSIONAL: Registered Professional Engineer
(Texas No. 46539)

CURRENT: Principal, CGH Associates

AREAS OF
EXPERIENCE:

Project, Chemical, and Environmental Services

EXPERIENCE:

Mr. Hickman has over 34 years of engineering experience. During this period, he has served in the capacities of President, Plant Manager, Plant Environmental Manager, Chief Engineer, Senior Project Engineer, Project Engineer, Plant Engineer, and Engineer I and II. He has extensive background in environmental services and project engineering.

Areas of specialization include the design and operation of commercial waste disposal facilities used for wastewater treatment, incineration, deepwell injection, and landfill disposal of industrial wastes. Mr. Hickman is an expert in air pollution control systems, such as scrubbers, baghouses, and wet electrostatic precipitators used on waste incinerators. His waste disposal experience includes liquid waste incineration, kiln incineration, fluidized bed incineration, deepwell injection, wastewater treatment systems, and landfill operations.

Specific projects on which Mr. Hickman has worked include a 100M gal/day commercial hazardous/non-hazardous wastewater treatment facility, a 200M gal/day-\$4MM commercial deepwell disposal facility, a 15MM lb/yr-\$1.3MM drum conveying solid shredding system, a 500M gal-\$2MM waste liquids tank storage system, a 8MM lb/yr-\$0.25MM lime slaking system, a 120MM Btu/hr kiln-afterburner incineration system with scrubber, an economic technical evaluation of a 460MM Btu/hr fluidized bed incineration system with two 135M lb/hr boilers, and design of a 230MM Btu/hr kiln-fluid bed chemical waste incineration site. Other areas of experience include hazardous waste facility closure plans. Texas Commission on Environmental Quality (TCEQ)/Environmental Protection Agency (EPA) RCRA Part A and B Permit Applications (including 230MM Btu/hr hazardous waste incineration site) unsaturated and saturated ground water monitoring system installations.

Mr. Hickman is also experienced in supervising legal teams associated with the process of obtaining TCEQ/EPA RCRA Permits and the issues of local control or ordinances.

FORMERLY ASSOCIATED WITH:

- Houston Chemical Services, Inc.
- United States Aluminate Company – Texas
(Southern Ionics Incorporated)
- GAF Corporation (ISP)
- S&B Engineers, Inc.
- Rollins Environmental Services (TX), Inc.
- Empak, Inc.
- E. I. duPont de Nemours and Company
- West Virginia Air Pollution Control Commission

The Wonderful World of Spent Caustic

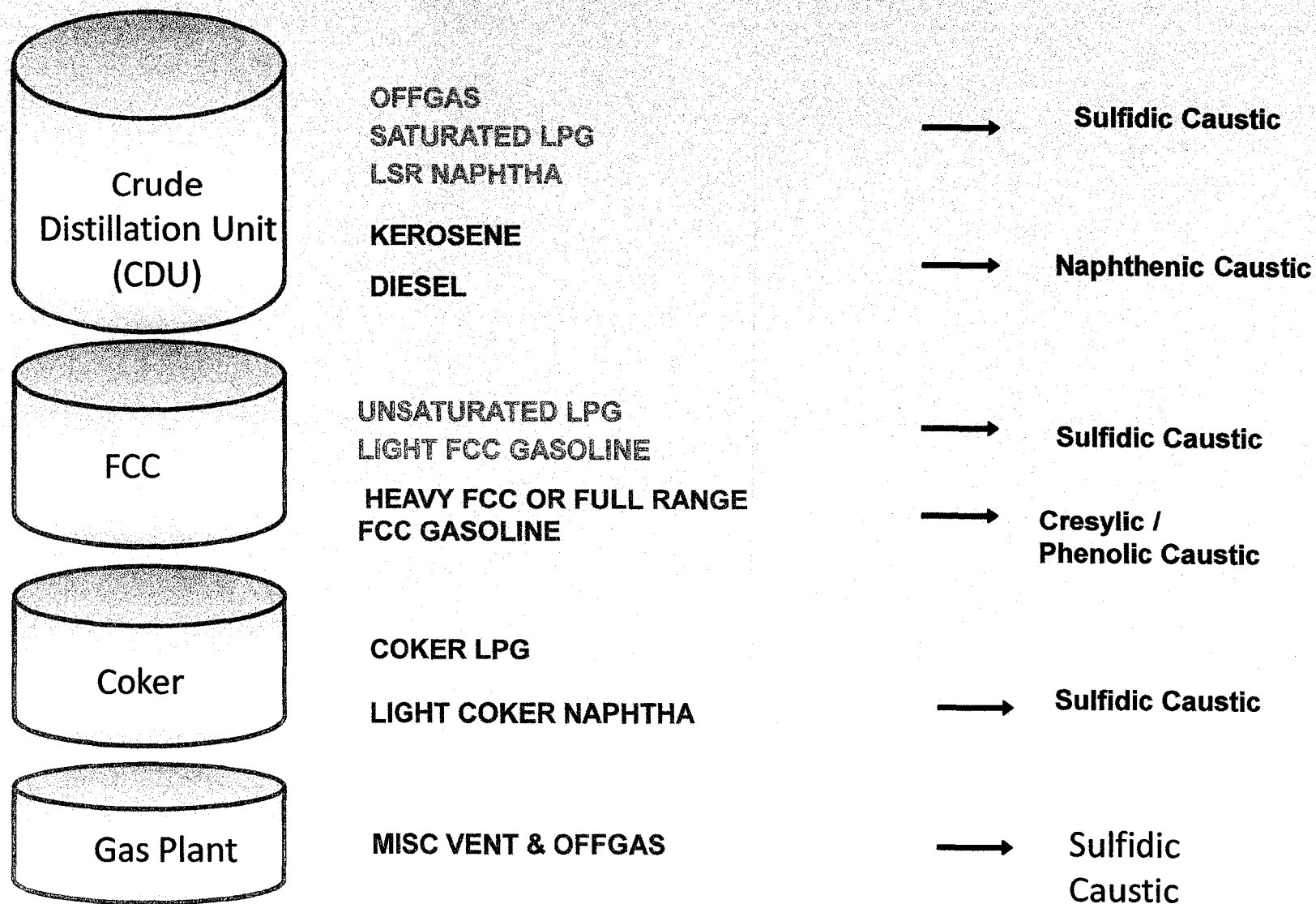
Sources of Spent Caustic

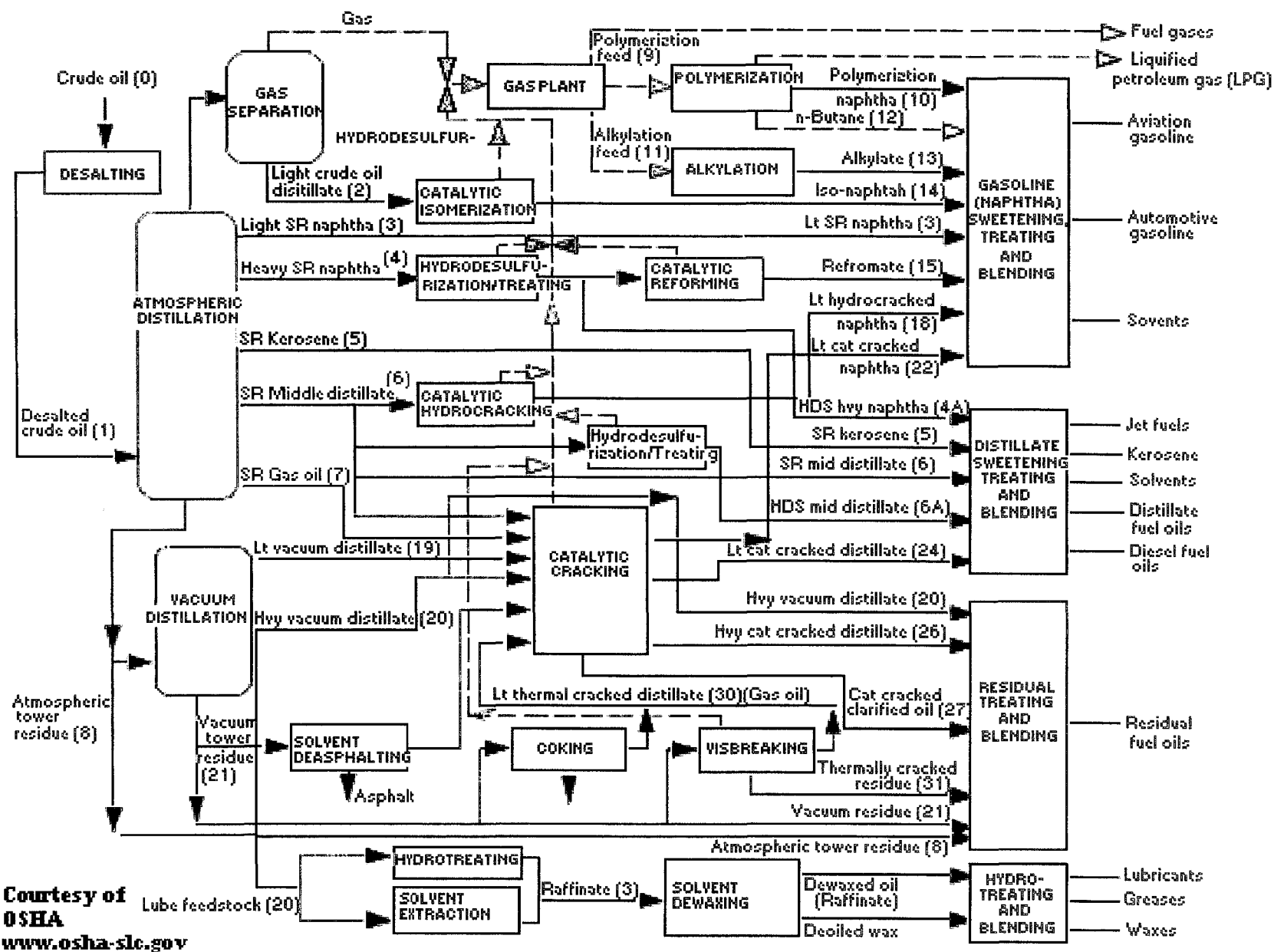
- **Ethylene spent caustic** comes from the caustic scrubbing of cracked gas from an ethylene cracker. This liquor is produced by a caustic scrubbing tower. Ethylene product gas is contaminated with $\text{H}_2\text{S}(\text{g})$ and $\text{CO}_2(\text{g})$, and those contaminants are removed by absorption in the caustic scrubbing tower to produce $\text{NaHS}(\text{aq})$ and $\text{Na}_2\text{CO}_3(\text{aq})$. The sodium hydroxide is consumed and the resulting wastewater (ethylene spent caustic) is contaminated with the sulfides and carbonates and a small fraction of organic compounds. These types of caustics typically contain less than 5% caustic.
- **Refinery spent caustic** comes from multiple sources: the caustic processing of gasoline; the caustic processing of kerosene/jet fuel; and the caustic processing of LPG. In these streams sulfides and organic acids are removed from the product streams into the caustic phase. The sodium hydroxide is consumed and the resulting wastewaters (cresylic for gasoline; naphthenic for kerosene/jet fuel; sulfidic for LPG -spent caustics) are often mixed and called **refinery spent caustic**. This spent caustic is contaminated with sulfides, carbonates, and in some cases a high fraction of organic acids.



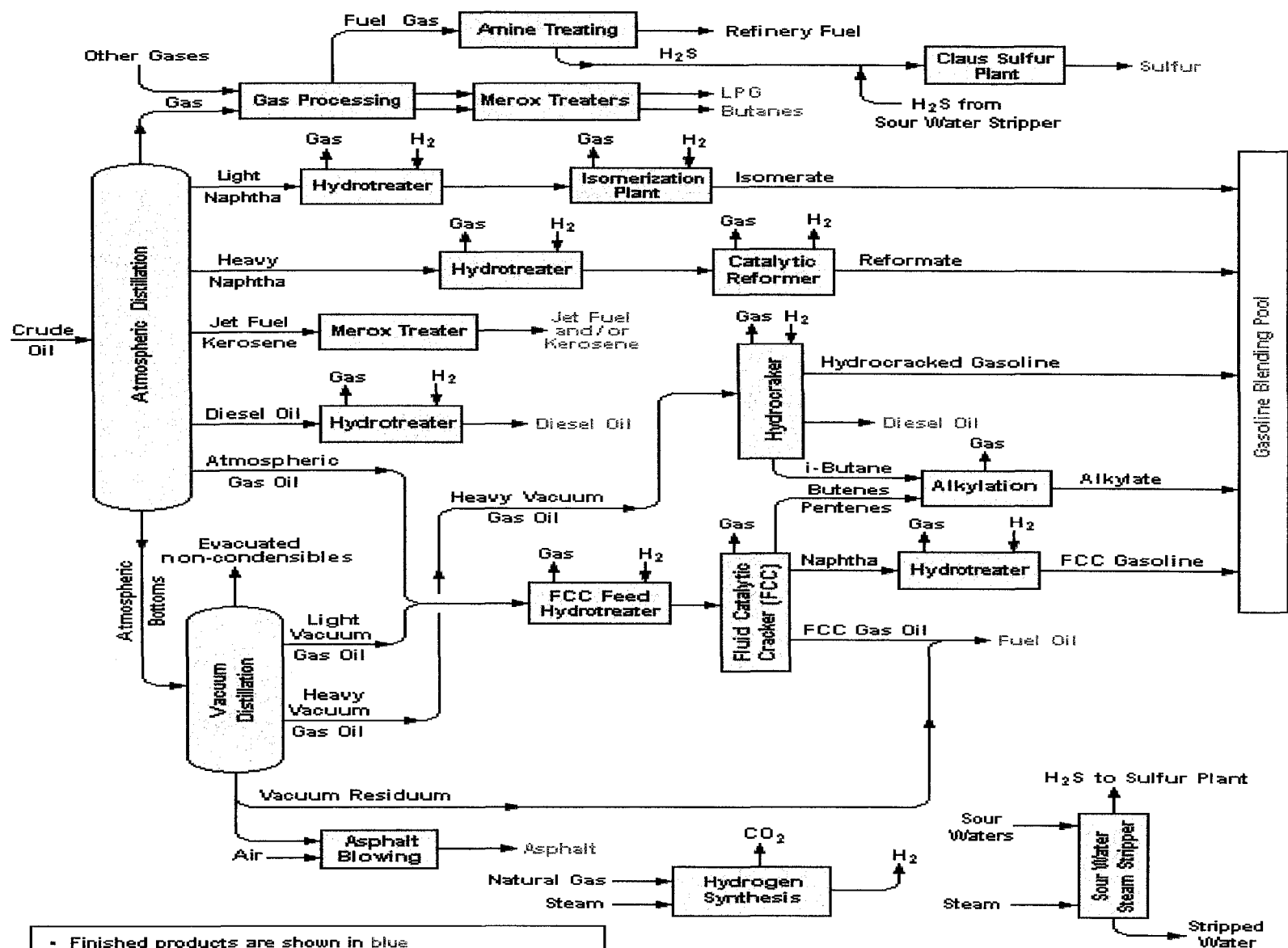
EPAHQ120001739

Refinery Sources





http://www.osha.gov/dts/osta/otm/otm_iv/otm_iv_2.html



- Finished products are shown in blue
- Many refineries also include vacuum residuum cokers
- The "other gases" entering the gas processing unit includes all the gas streams from the various process units

MAJOR REFINERY PRODUCTS

- **Gasoline.** The most important refinery product is motor gasoline, a blend of hydrocarbons with boiling ranges from ambient temperatures to about 400 °F. The important qualities for gasoline are octane number (antiknock), volatility (starting and vapor lock), and vapor pressure (environmental control). Additives are often used to enhance performance and provide protection against oxidation and rust formation.
- **Kerosene.** Kerosene is a refined middle-distillate petroleum product that finds considerable use as a jet fuel and around the world in cooking and space heating. When used as a jet fuel, some of the critical qualities are freeze point, flash point, and smoke point. Commercial jet fuel has a boiling range of about 375°-525° F, and military jet fuel 130°-550° F. Kerosene, with less-critical specifications, is used for lighting, heating, solvents, and blending into diesel fuel.
- **Liquified Petroleum Gas (LPG).** LPG, which consists principally of propane and butane, is produced for use as fuel and is an intermediate material in the manufacture of petrochemicals. The important specifications for proper performance include vapor pressure and control of contaminants.
- **Distillate Fuels.** Diesel fuels and domestic heating oils have boiling ranges of about 400°-700° F. The desirable qualities required for distillate fuels include controlled flash and pour points, clean burning, no deposit formation in storage tanks, and a proper diesel fuel cetane rating for good starting and combustion.

Refinery Products - Continued

Residual Fuels. Many marine vessels, power plants, commercial buildings and industrial facilities use residual fuels or combinations of residual and distillate fuels for heating and processing. The two most critical specifications of residual fuels are viscosity and low sulfur content for environmental control.

Coke and Asphalt. Coke is almost pure carbon with a variety of uses from electrodes to charcoal briquets. Asphalt, used for roads and roofing materials, must be inert to most chemicals and weather conditions.

Solvents. A variety of products, whose boiling points and hydrocarbon composition are closely controlled, are produced for use as solvents. These include benzene, toluene, and xylene.

Petrochemicals. Many products derived from crude oil refining, such as ethylene, propylene, butylene, and isobutylene, are primarily intended for use as petrochemical feedstock in the production of plastics, synthetic fibers, synthetic rubbers, and other products.

Lubricants. Special refining processes produce lubricating oil base stocks. Additives such as demulsifiers, antioxidants, and viscosity improvers are blended into the base stocks to provide the characteristics required for motor oils, industrial greases, lubricants, and cutting oils. The most critical quality for lubricating-oil base stock is a high viscosity index which provides for

Why Some Refiners do not Treat Spent Caustic in the WWTP*

1. **Organic content can be quite large and vary in concentration. COD can be over 600,000 ppm. This can overload the WWTP**
2. **Phenols and cresols that are present in significant concentrations typically have very low discharge limits. Often less than 1 ppm.**
3. **Odor from spent caustic can be a significant problem in sensitive areas.**
4. **Sodium Naphthenate is a very effective soap that can cause fouling of equipment, stable emulsions reducing skimming efficiencies, and problems with the drying of the sludge generated from the WWTP.**
5. **Expansion of WWTP can cost tens of millions of dollars. New permits for expansion may be difficult to obtain.**

* WWTP = Waste Water Treating Plant

Refinery Options for Spent Caustic

- Treat internally in own WWTP – Most economical if in place. New WWTP for refineries and chemical plants cost over 10 million dollars.
- Purchase treating equipment – Oxidizers- Cost is typically over 5 million dollars for this type of equipment. Merichem and Zimpro are the largest suppliers of this type of technology.
- Send off site for incineration – High costs, goes out as waste.
- Deep well injection – Intermediate cost, however not all caustics can be injected easily.
- Sending off-site for reuse as pulping chemical or other approved use.

Why Refiners Caustic Treat

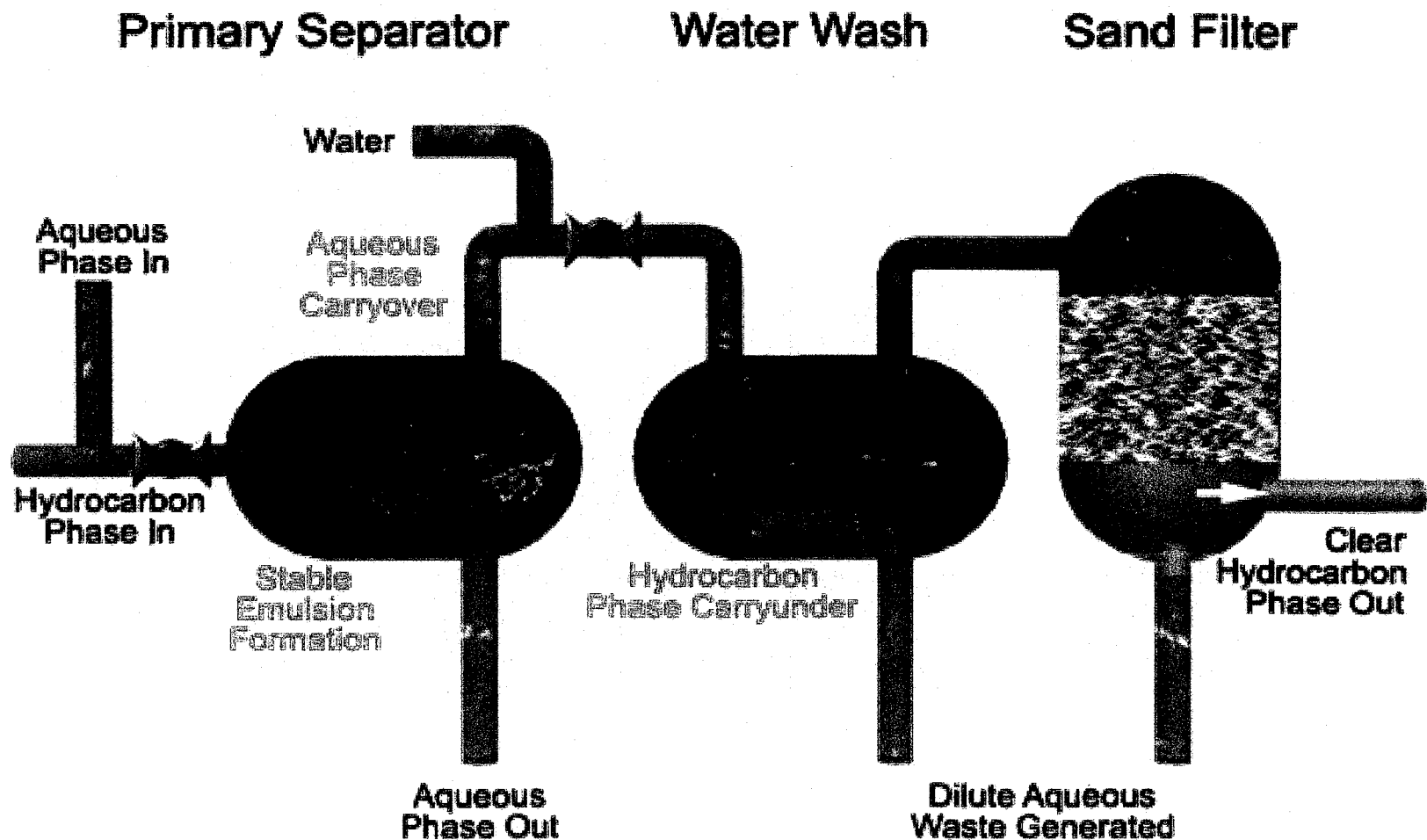
1. **Reduce Hydrogen Sulfide Content-** Refiners usually treat LPG and light naphtha with 10 to 15% caustic. If the concentration of hydrogen sulfide is very high, refiners will typically treat with amines instead of caustic since they can be regenerated more easily.
2. **Reduce acidity of Kerosene—** Dilute caustic extraction (~2° to 8°Be) typically reduces acidity to less than 0.03 mg KOH/g. Strong caustic can not be used in higher TAN applications due to stable emulsion formation when strong caustic reacts with naphthenic acid.
3. **Reduce Mercaptan Content – Stronger Caustic** (generally 15° to 25°Be mixed with a cobalt catalyst) reduces the mercaptan content to help meet mercaptan specifications and pass Doctor tests.
4. **Reduce Corrosion -** In some cases, caustic treating is needed to pass either silver strip or copper strip tests.
5. **Most Cost Effective -** Caustic treating is the most cost effective method to reduce acidity and mercaptan content. Caustic treating is typically 1/10 the cost of hydrotreating. Typical hydrotreaters cost 20 to 50 Million dollars. Caustic treaters cost 2 to 4 Million dollars.

Types of Caustic Treaters

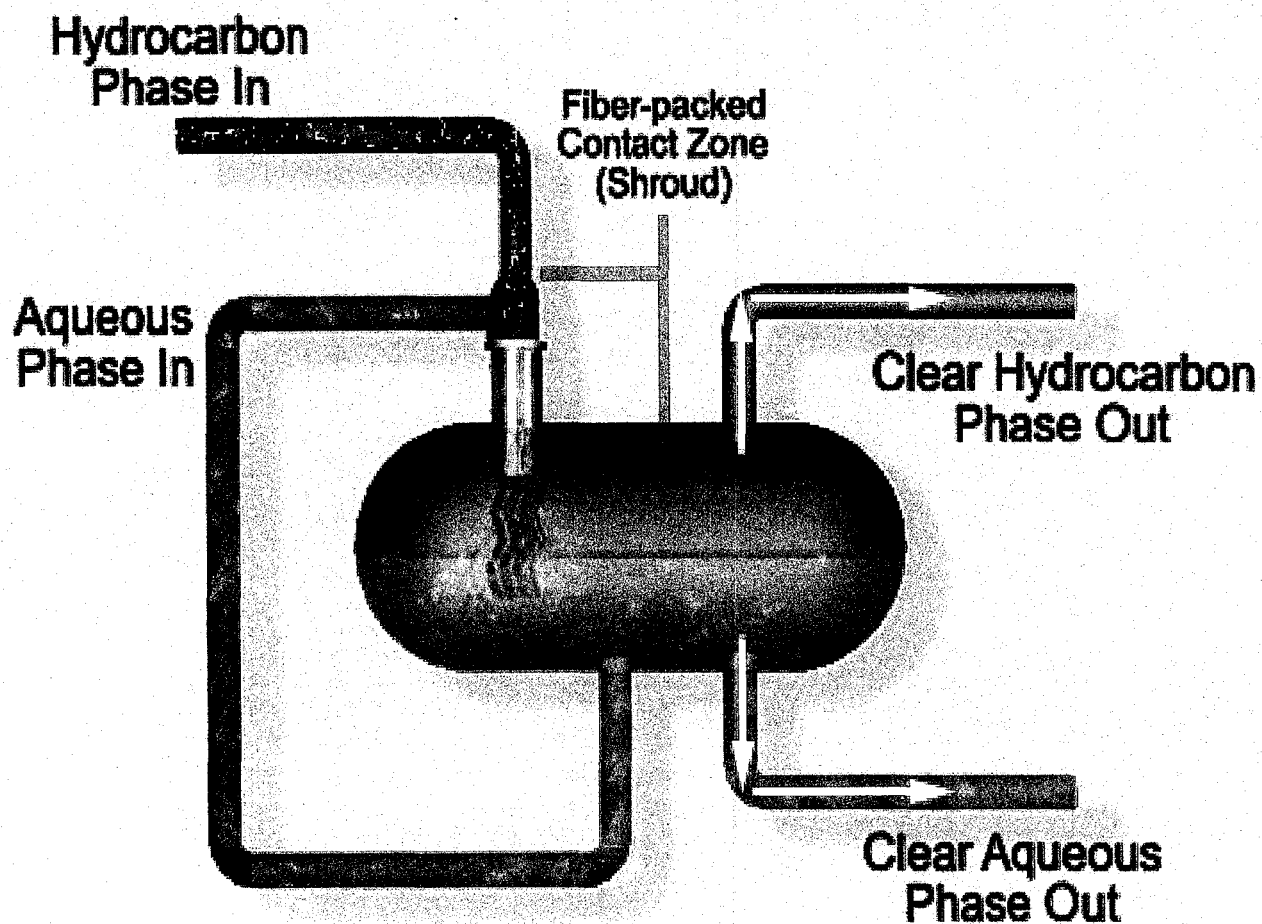
There are three major types of caustic treaters:

- 1) Merichem Fiber-Film Treaters – Uses proprietary fiber technology as the mixing device. Caustic strength is usually higher when compared to Merox Treaters. Most treaters sold today are Merichem treaters.
- 2) UOP Merox treaters- Uses mix valve technology. Typically caustic strength is lower in caustic concentration. This technology was very popular years ago. Many Merox treaters are still being used.
- 3) In house caustic treaters – Comes in all shapes and sizes. Developed by the plant or third party engineering companies.

Typical Caustic Treater

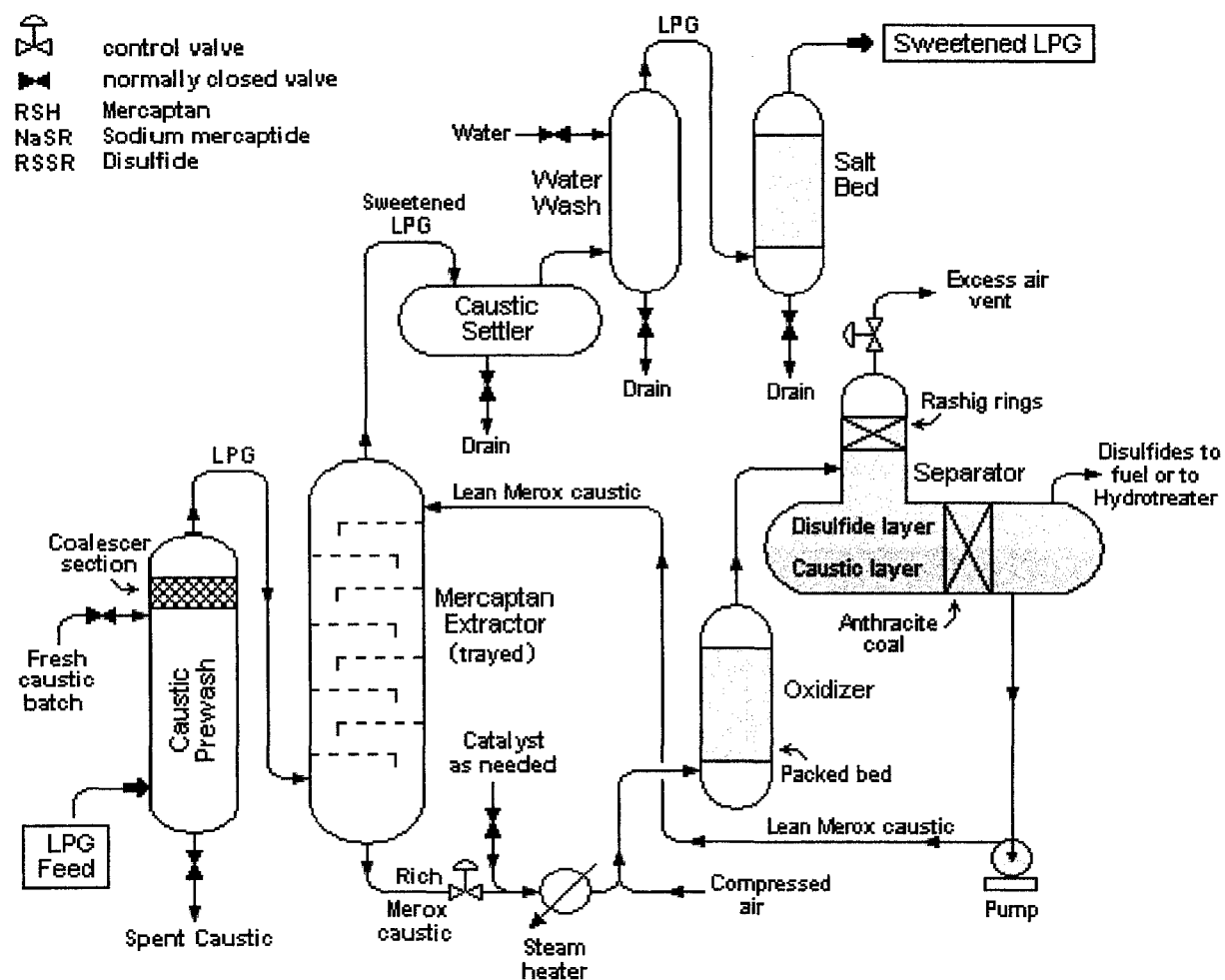


Typical Merichem Fiber-film Unit



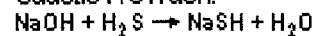
Merox Treater

- **Merox™** is an acronym for mercaptan (thiol) oxidation. It is a proprietary catalytic chemical process developed by Universal Oil Products (UOP) and used in oil refineries and natural gas processing plants to remove mercaptans from LPG, propane, butanes, light naphthas, kerosene and jetfuel by converting them to liquid hydrocarbon disulfides.
- The Merox process requires an alkaline environment which, in some of the process versions, is provided by an aqueous solution of sodium hydroxide (NaOH), a strong base, commonly referred to as *caustic*.
- The catalyst (cobalt based) in some versions of the process is a water-soluble liquid. In other versions, the catalyst is impregnated onto charcoal granules.
- Processes within oil refineries or natural gas processing plants that remove mercaptans and/or hydrogen sulfide (H_2S) are commonly referred to as *sweetening* processes because they results in products which no longer have the sour, foul odors of mercaptans and hydrogen sulfide. The liquid hydrocarbon disulfides may remain in the sweetened products, they may be used as part of the refinery or natural gas processing plant fuel, or they may be processed further.
- The Merox process is usually more economical than using a catalytic hydrodesulphurization process for much the same purpose.

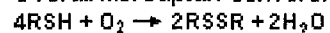


CHEMICAL REACTIONS IN LPG MEROX TREATING

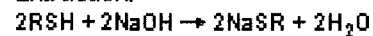
Caustic Prewash:



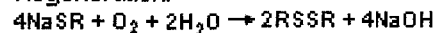
Overall Mercaptan Conversion:



Extraction:



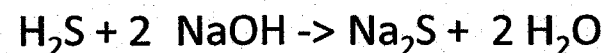
Regeneration:



Spent Caustic Composition

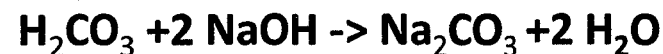
Sodium Hydroxide- Residual amount of sodium hydroxide are typical in most spent caustics. Concentrations vary from 2 to 30 wt%.

Sodium Sulfide- Produced from the reaction with Hydrogen Sulfide (H₂S) from light distillates or vent gas scrubbing.



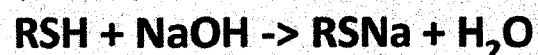
Sodium Phenolate and Cresylate – Produced from the reaction with phenol and cresylic acid. These compounds are formed in refinery FCC unit. This type of caustic is generally referred to as **Cresylic** or **Phenolic Caustic**.

Sodium Carbonate – This is primarily produced from vent gas scrubbing of CO₂

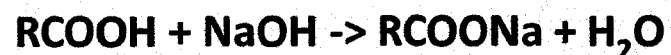


Composition (Continued)

Sodium Mercaptide- This compound is formed from the reaction with mercaptans (thiols).



Sodium Naphthenates - Produced from the reaction with naphthenic acid. This caustic is produced from the caustic treating of jet fuel, kerosene, or diesel. This type of caustic is referred to as **Naphthenic Caustic**.



Dissolved Organics- Organics are often soluble in various concentrations in spent caustics.

Amines (DEA, MEA etc.)- Amines are often found in spent caustics in concentrations of 0 to 15 wt%. Amines are often found in processes is often found where Amine treating upstream of caustic treating. This is most common where Amines are used to treat LPG where there is carryover to a caustic polishing unit.

Typical Characteristics of Refinery Spent Sulfidic and Phenolic Caustic

Parameter	Range
pH	>12
Total Organics	0 to 5 wt. %
Sodium Hydroxide	1 to 20 wt. %
Sodium Sulfide	0 to 10 wt. %
Sodium Carbonate	0 to 10 wt. %
Phenols / Cresols	1 to 10 wt. %
COD	5,000 to >200,000 ppm
Sulfur compounds	0 to 3 wt. %

Typical Characteristics of Refinery Naphthenic Caustic

Parameter	Range
pH	>12
Total Organics	3 to 30 wt. %
Sodium Hydroxide	0.5 to 5 wt. %
Naphthenic Acid	1 to 20 wt. %
Phenols / Cresols	1 to 10 wt. %
COD	50,000 to >600,000 ppm
Sulfur compounds	0 to 3 wt. %

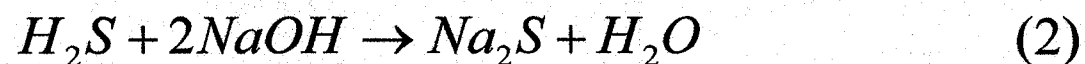
Typical Characteristics of Ethylene Caustic

Parameter	Range
pH	>12
Total Organics	1 to 2 wt. %
Sodium Hydroxide	1 to 5 wt. %
Sodium Carbonate	1 to 5 wt. %
Phenols / Cresols	0 wt. %
COD	20,000 to >60,000 ppm
Sulfur compounds	0 to 3 wt. %

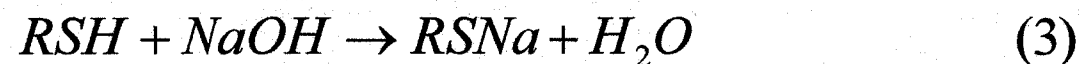
Chemical Reactions



Carbon Dioxide



Hydrogen Sulfide



Mercaptan Sulfur



Naphthenic Acid

Kraft Mill Overview



The Kraft Process

- The **Kraft process** (also known as **Kraft pulping** or **sulfate process**) produces wood pulp which is almost pure cellulose fibers by using sodium hydroxide and sodium sulfide to extract the lignin from wood chips in large pressure vessels called digesters. Some digesters operate in a batch manner and some in a continuous process such as the Kamyr digester. Digesters producing 1,000 tones of pulp per day and more are common.
- The process name is derived from German *kraft*, meaning *strength/power*; both capitalized and lowercase names (*Kraft process* and *kraft process*) appear in the literature, but "kraft" is most commonly used in the pulp and paper industry. It was developed by Carl Dahl in 1879 and the first kraft mill started (in Sweden) in 1890. The invention of the recovery boiler by G.H. Tomlinson in the early 1930s, was a milestone in the advancement of the kraft process. It enabled the recovery and reuse of the inorganic pulping chemicals such that a kraft mill is almost closed-cycle with respect to inorganic chemicals, apart from those used in the bleaching process. This was one of the reasons that in the 1940s the kraft process took over from the sulfite process as the dominant method for producing wood pulp
- Kraft pulp makes paper that is stronger than that made from any of the other pulping processes. The sulfite process degrades cellulose more than the kraft process and degraded cellulose makes weaker fibers. Kraft pulping removes most of the lignin present originally in the wood while the mechanical pulping processes leave most of the lignin in the fibers. The hydrophobic nature of lignin interferes with the formation of the hydrogen bonds between cellulose (and hemicellulose) in the fibers needed for the strength of paper (strength refers to tensile strength and resistance to tearing).
- Kraft pulp is darker than other wood pulps, but it can be bleached to make very white pulp. Fully bleached kraft pulp is used to make high quality paper where strength, whiteness and resistance to yellowing are important.

Pulping process

- Wood chips and **white liquor**, a mixture of sodium hydroxide and sodium sulfide, produced in the recovery process, are added to the top of the digester. In a continuous digester the materials are fed at a rate which allows the pulping reaction to be complete by the time the material exit the reactor. Typically this takes several hours and is done at high temperatures (130 to 180 °C (265 to 355 °F). These conditions break down lignin and some hemicelluloses and the fragments become soluble in the strongly basic liquid. The solid pulp (about 50% by weight based on the dry wood chips) is collected and washed. At this point the pulp is quite brown and is known as "brown stock". The combined liquids, known as black liquor (so called because of its color), contain lignin fragments, carbohydrates from the breakdown of hemicellulose, sodium carbonate, sodium sulfate and other inorganic salts.

Recovery process

- The black liquor is concentrated in multiple effect evaporator to 60% or even 80% solids ("heavy black liquor") and burned in the recovery boiler to recover the inorganic chemicals for reuse in the pulping process. Higher solids in the concentrated black liquor increases the energy and chemical efficiency of the recovery cycle, but also gives higher viscosity and precipitation of solids (plugging and fouling of equipment). The combustion is carried out such that sodium sulfate is reduced to sodium sulfide by the organic carbon in the mixture:

(CONTINUED)

Pulping Process (Continued)

1. $\text{Na}_2\text{SO}_4 + 2 \text{C} \rightarrow \text{Na}_2\text{S} + 2 \text{CO}_2$ The molten salts ("smelt") from the recovery boiler are dissolved in water to give a solution of sodium carbonate and sodium sulfide, known as "green liquor". This liquid is mixed with calcium hydroxide to regenerate the white liquor used in the pulping process (Na_2S is shown since it is part of the green liquor, but does not participate in the reaction):

2. $\text{Na}_2\text{S} + 2 \text{Na}_2\text{CO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Na}_2\text{S} + 2 \text{NaOH} + \text{CaCO}_3$ Calcium carbonate precipitates from the white liquor and is recovered and heated in a lime kiln where it is converted to calcium oxide (lime).

3. $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$ Calcium oxide (lime) is reacted with water to regenerate the calcium hydroxide used in Reaction 2:

4. $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2$ The combination of reactions 1 through 4 form a closed cycle with respect to sodium, sulfur and calcium.

The recovery boiler also generates high pressure steam which is led to turbogenerators, reducing the steam pressure for the mill use and generating electricity. A modern kraft pulp mill is more than self-sufficient in its electrical generation and normally will provide a net flow of energy to the local electrical grid.

Pineville Mill Example

Overview

Located in central Louisiana, 220 miles from New Orleans, the Pineville mill resides on a 1200-acre site, and produces unbleached kraft linerboard, fiber can stock, and kraft roll pulp.

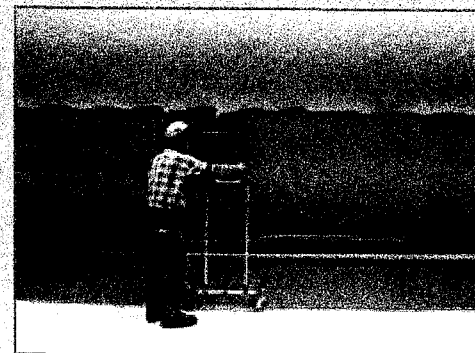
Production

Our Pineville mill is conveniently located near several major US gulf ports to ship overseas and domestically by rail and truck.

The mill uses 100% virgin southern pine-furnish. The long softwood fibers produce a linerboard with exceptional physical strength and a consistent print surface. The Pineville paper machine is 282 inches wide.

Environmental Stewardship

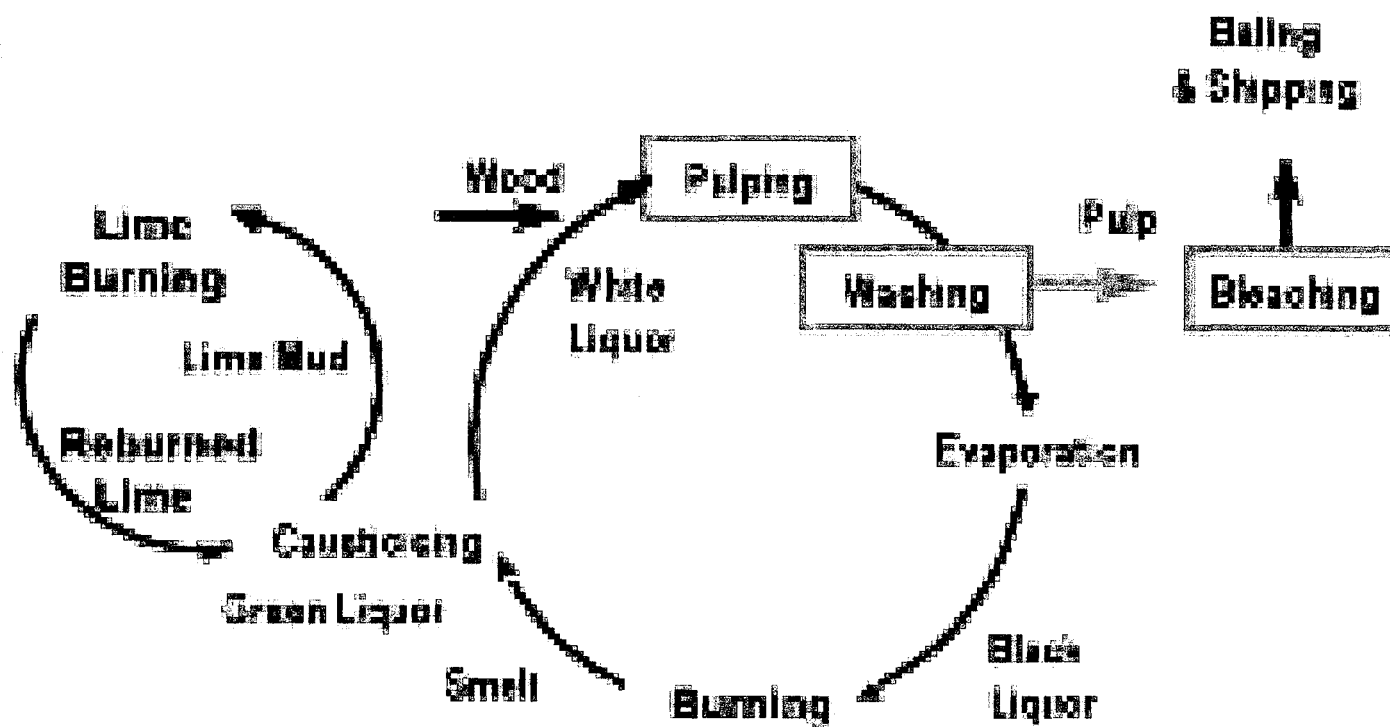
The Pineville mill is committed to balancing our business goals with conscientious stewardship of the environment.

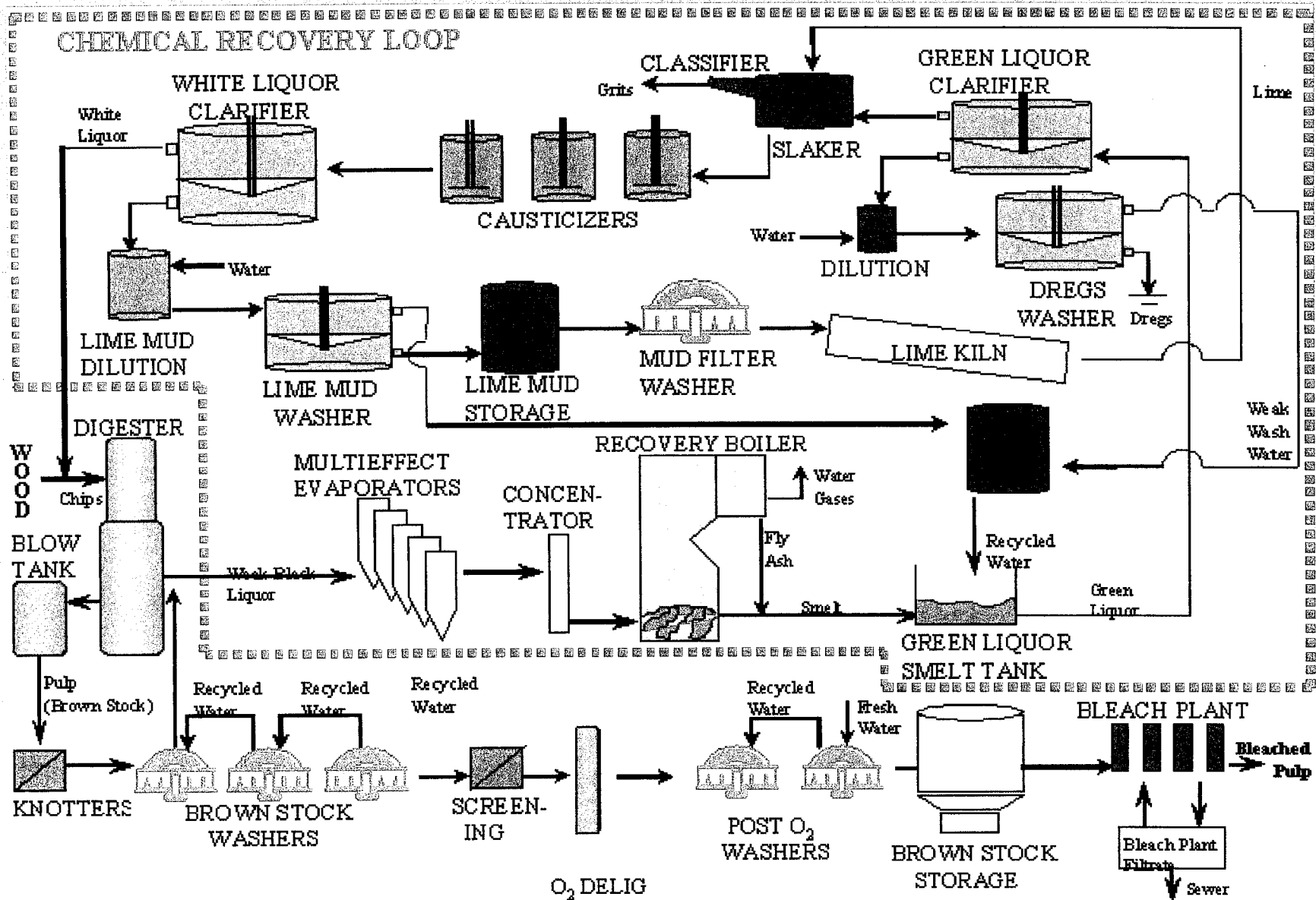


Most recently, the mill was chosen to receive one of only seven statewide Governor's Awards for Outstanding Pollution Prevention Achievement for getting approval to market wood ash as a beneficial product that returns valuable nutrients to the soil. Other similar awards have been received in recent years, including company environmental excellence awards for innovative projects to conserve valuable landfill space and to restore industrial facilities back to their natural conditions.



Simplified Kraft Liquor Cycle



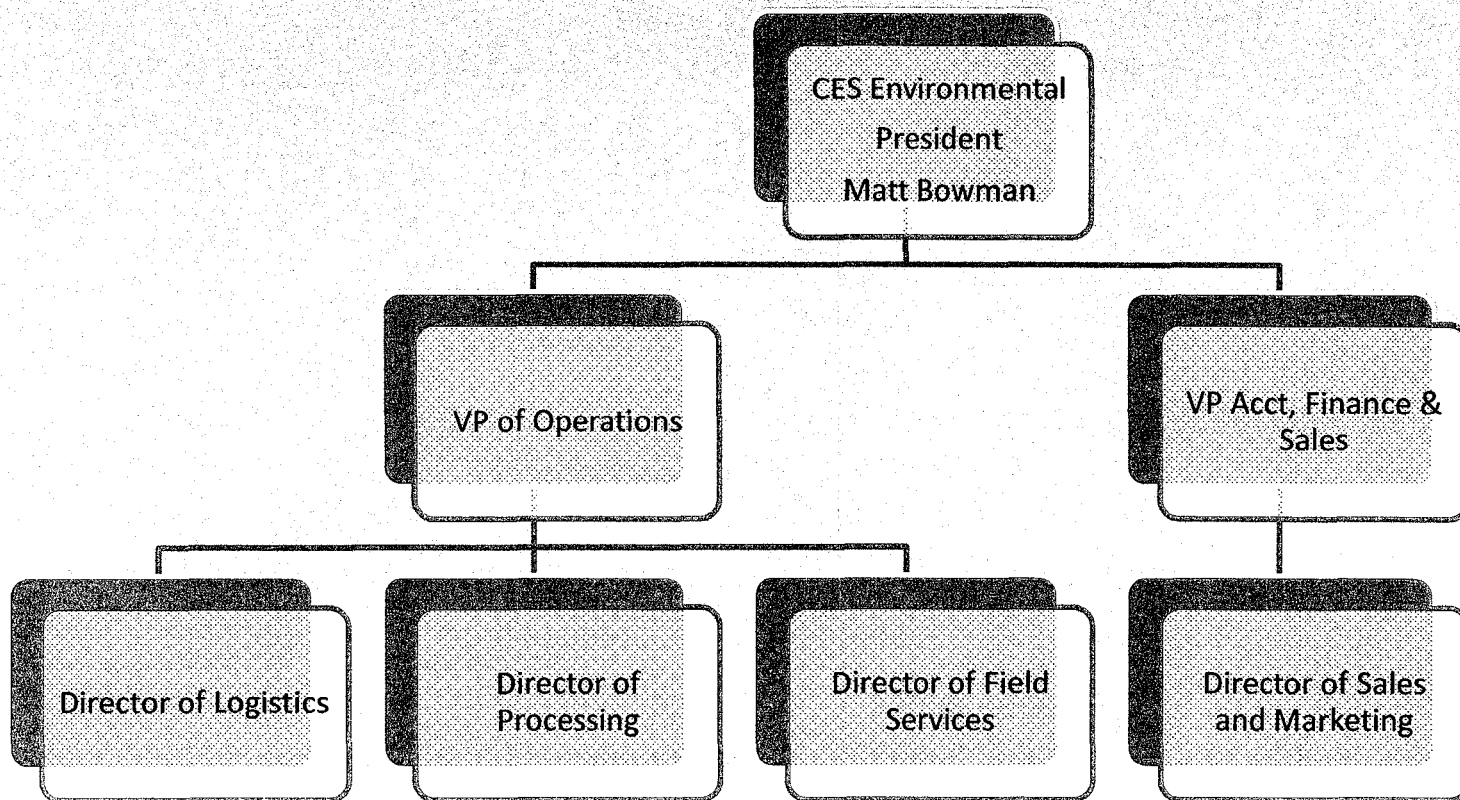


What Kraft Mills Want

- Sodium – Sodium – Sodium- The higher the concentration the better. Generally over 6% is desired. 5% sodium hydroxide content is considered a minimum.
- Sodium Sulfide – Most mills prefer caustic with low sodium sulfide content (less than 1%). However, some mills during different intervals want caustic with high sulfide content.
- Mills like caustic that is clear in color with little or no solids. They will make allowances for dark caustic, but can be sensitive to solids.

What Mills Don't Want

- Hydrocarbons – Mills are very sensitive to hydrocarbons. Hydrocarbons in their caustic tanks are a safety issue which could cause personal injury. This is the most important specification for spent caustic.
- Potassium and Chloride- Caustic should contain less than 200 ppm potassium. Chloride levels should be low. Potassium causes fouling on the reboiler. Potassium leads to unplanned shutdown of the reboiler which effectively shuts down the mill. Costs for a shutdown runs in the hundreds of thousands of dollars per occurrence.
- Solids- Visible solids are not allowed



Pulping Process

Purpose of cooking in chemical pulp production is to use chemicals and heat to remove fiber binding lignin so chips defibrate easily. Fibers containing cellulose are tried to keep as long, unbroken and strong as possible. Also wood extractives which can later cause foaming and precipitants in the process are tried to remove. Today sulfate cooking is the most commonly used pulp production method.

Chemicals which dissolve as much lignin and as little cellulose as possible are used in pulping. Sulfate process uses white liquor, a mixture of sodium hydroxide (NaOH) and sodium sulfide (Na_2S). Sodium hydroxide degradates lignin and sodium sulfide fastens cooking reactions and decreases cellulose degradation caused by sodium hydroxide. Temperature in sulfate pulping is normally 150 - 170 °C.

Pulping (Continued)

Lignin amount left in fibers is expressed with a kappa number . Lignin causes pulp to turn brown during cooking. Because bleaching chemicals are much more expensive than cooking chemicals, as much as possible of the lignin is tried to remove during the cooking process. However, too extensive lignin removal causes cellulose degradation to increase. This decreases pulp strength and yield . Today, typical kappa number for pulp to be bleached is 14 - 20 for hardwood and 20 - 30 for softwood pulp. If the pulp is not beached, the kappa number after cooking will be much higher, typically 40 - 100. Pulp yield is typically 50 - 53% for hardwood and 46 - 49% for softwood.

Controllability and smoothness of the cooking process are requirements for succeeding of the following process phases. Digester plant faults reflect to other departments and cause changes for pulp properties such as strength, brightness and beatability changes, debris and brightness reversion.

Cooking Chemicals

- **White liquor** is a chemical mixture used in sulfate pulping. The effective chemicals of it are **sodium hydroxide** (NaOH) and **sodium sulfide** (Na_2S). The concentration of those compounds in white liquor is expressed as **affecting** e.g. **active alkali** or **effective alkali** (g/l):
- **Black liquor** is white liquor which has reacted in digester and to which wood compounds have dissolved. Black color comes from lignin compounds colored by alkali and dissolved to liquor.
- Sodium hydroxide and sulfide are expressed in grams per liter of sodium hydroxide or sodium oxide (Na_2O) equivalents. Practice is based on sodium contents of the compounds. Conversion factor from Na_2O to NaOH is 1.29 and 0.775 in reverse direction.
- **Green liquor** is recovery boiler smelt dissolved to weak white liquor. In other words it is black liquor with organic incinerated. In addition other reactions have taken place, for example sodium sulfate has transformed to sodium sulfide. Green liquor is processed to white liquor in recaustizing plant.
- Sodium sulfide concentration in cooking liquor is expressed as **sulfidity** (%). Sulfidity is usually on the level 35 - 45% in modern mills. **Reduction** (%) shows how completely the nearly inert sodium sulfate has been reduced to useful sodium sulfide. Reduction takes place in recovery boiler. **Causticity** (%) shows chemical efficiency of white liquor production (causticization). It shows how much inert sodium carbonate has been transformed to useful sodium hydroxide.

Total Alkali

Due to reaction balance during white liquor production the white liquor **concentration** is approximately 140 - 170 g/l active alkali as NaOH. White liquor includes also other sodium salts, such as sodium sulfate (Na_2SO_4) and sodium carbonate (Na_2CO_3) and small amounts of sulfites and chlorides. All sodium salts can be expressed as **total alkali** (TTA, titrating alkali, g/l). All sodium compounds are taken into account, such as sodium sulfate and carbonate. Large amounts of sulfate and carbonate in white liquor indicate malfunctions in recovery boiler or recausticizing plant. Because sulfate and carbonate don't significantly participate in cooking processes, they are only unnecessary loads in chemical circulation. The white liquor contains also other substances not reacting in cooking, such as chlorides and calcium compounds. The amount of these so called inert materials depends greatly on mill chemical circulation, for example on white liquor filtration success.

Sulfidity

- Sulfidity is the molar ratio of sodium and sulfide ion. It is calculated by the following formula:

$$\%S/\%Na * 143 = \% \text{ Sulfidity}$$

Sulfidity less than 30 is considered low

Sulfidity over 100 is considered high

The maximum sulfidity of any solution is 200. As sulfidity approaches 200, care must be taken during transport and handling due to the possibility of hydrogen sulfide being present in the headspace.

Spent Caustic – Customer Spiel

Spent Caustics are produced from the contacting sodium hydroxide with hydrocarbons, gasses or chemical streams. The caustic is typically used to extract acidic species to meet quality specifications or emissions. Once the caustic has been used in the initial process, it still has usefulness in certain industries for the residual chemicals contained. The spent caustic when used directly as received, without reclamation, is a product and is **not** classified as a waste by the EPA. Specifically, under RCRA part 261.2(e)(1)(ii) “Materials that are not solid waste when ... Used or reused as effective substitutes for commercial products”.

Customer Spiel (Continued)

CES has partnered with several large consumers in the paper industry which utilize the spent caustic as a direct substitute for other commercially available products. Namely, sodium hydroxide, potassium hydroxide, and or sodium sulfide. For years the paper industry has utilized spent caustic as an economical alternative to pulping chemicals.

The biggest challenge has always been is to match the highly variable production volume and quality from the producers with the highly variable requirements of the consumer. CES's network of suppliers, terminals, owned and operated equipment, and consumers are instrumental in matching supplies with demand. The end result is a cost effective solution for both suppliers and consumers.

Customer Spiel (Continued)

CES owns and operates an extensive transportation and terminal infrastructure. Our current fleet consists of over 40 tractors and 70 trailers each equipped with the latest in GPS tracking and monitoring. We can safely and responsibly transport your all type of spent caustics via CES owned and operated tank trucks. By owning our own equipment, we insure that all of the drivers/operators receive are properly trained and have all the required safety certification for the transportation and safe loading and unloading of spent caustic. For shipments by other modes, we provide transport by third party rail car, barge, or ocean-going tanker.

Visit Strategy

- Each Sales person get with G Lenertz and R Tafilaj to assign priority for assigned accounts. If RRT is not available, G Lenertz will cover.
- For refineries with contacts in place, call contact, skip to number 2 below.
- If no contact, ask reception personal:
 1. Does the site generate caustic /other? If so, who has the responsibility. Generally this will be in order of likelihood: Unit engineer, procurement, environmental, movements.
 2. Relate spiel of previous pages. Stress reliable non waste handling of caustic. All modes of transportation available.
 3. Ask for meeting. If not accepted, provide follow up email that summarizes services.

Pricing

Pricing is determined by overall quality and concentration of the spent caustics various constituents, the transportation modes, and overall quantity. The pricing of each caustic usually starts with getting a sample. Samples should be analyzed for the following:

- Caustic concentration
- Sulfide concentration
- Solids content
- Visual
- CES will gladly analyze and price each sample free of any obligation to ship. A one pint sample is sufficient.

Attachment "C"

RASGAS

Tender Response Requirements

Question 7

Environmental Audit Program

ENVIRONMENTAL AUDIT PROGRAM



June 2007

Environmental Management Plan
June 2007

Written by Karl Guidry
HSE Manager

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ENVIRONMENTAL AUDIT PROGRAM CES ENVIRONMENTAL, INC.

1.0 INTRODUCTION

The management and personnel of CES Environmental, Inc. (CES) realize and acknowledge the importance of preventing environmental excursions and incidents from occurring as it relates to the navigable waters of the United States and preventing any harmful effects of our facility operations to the environment. The following Environmental Management Plan is designed to serve two purposes to help protect the environment.

- First, it provides the facility management guidelines which will be used to prevent environmental excursions and incidents from occurring.
- Second, should a excursions or release occur, it describes the actions to stop the excursions and minimize any harmful effects, including notifications of appropriate government agencies as required under federal and state regulations.

Management is committed to ensuring that CES Environmental, Inc. maintains the manpower, equipment and materials required to expeditiously control and remove any quantity of product that may be discharged by the facility. This commitment is to ensure the safety of personnel, prevent any discharge to any navigable waters and to protect human health and the environment.

For the purpose of handling excursions responses effectively, this ENVIRONMENTAL MANAGEMENT plan provides: the location of product storage areas; proper storage and usage management procedures to be followed; equipment available; and available outside resources.

This ENVIRONMENTAL MANAGEMENT plan was developed in accordance with the requirements of Title 40 CFR Part 112, and the applicable requirements of the TCEQ. This facility is not considered a "Substantial Harm" facility as defined in 40 CFR 112. This determination is based on the product storage and transfer activities conducted at the facility.

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Written by Karl Guidry
HSE Manager

1.1 Management Approval

This ENVIRONMENTAL MANAGEMENT Plan, required under 40 CFR Parts 112, amended April 2003 will be implemented as described herein, and is approved by:

Date:

Mr. Matt Bowman
President
CES Environmental, Inc.

A. Purpose

This environmental management system summarizes the requirements of internal environmental audit protocols and practices to be conducted by CES Environmental Inc. The audit team members will consist of a cross section of facility personnel ranging from HSE Managers, Operations, Maintenance and Administrative).

B. Objectives:

The compliance status of the plant with respect to applicable federal, state, and local laws and regulations;

The plant's conformance with internal environmental policies and procedures as established by CES Environmental; and

The environmental management systems which currently exist at the plant.

The objective of this report is to communicate our audit findings and recommendations to CES Environmental management, the Office of the President of CES Environmental, Inc. It is not meant to imply legal certification of compliance or noncompliance.

C. Scope

The scope of the audit will include issues within each of the following functional areas:

Water Pollution Control

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Solid and Hazardous Waste Management Spill Control and Emergency Planning

Special attention will be given to the issues noted in an audit completed prior to June 2007 by the Environmental Task Force. The findings of previous audits are to be addressed individually within the final report, and a summary list of those findings is to be included as Appendix 1 in the final report.

D. Approach

The field work of the audit is to be completed within a four day period, preferably a Monday – Friday schedule. The period under review should be determined in January of the operating year. The audit should be based on:

Physical inspections of the plant;

Examination of environmental operating records and documentation;

Interviews and discussions with key plant people; and

Verification procedures designed to assess the plant's application of, and adherence to environmental laws and regulations, and plant policies and procedures.

The process by which this audit is to be conducted is consistent with the general state of the art of environmental auditing and the best professional judgment of the audit team members. The audit will follow an audit protocol provided by HSE Managers, Mr. Karl Guidry and Prabhakar Thangudu which was developed for the CES Environmental audit. It should be understood that the audits will consist of evaluating a sample of the total information available and will be conducted in a short span of time relative to the review period. The audit will be directed at following up on previously noted issues and sampling major facets of environmental performance during the period under review. This method is intended to uncover major deficiencies identify any and all potential problems.

E. Report Format

The report will focus on the current status of issues noted in the audit to be completed by the CES Environmental Task Force and new issues identified by the audit team. Where exceptions to regulatory standards are identified, specific references to laws and regulations are provided. In other cases the Audit Team will identify situations that do not relate to specific regulatory requirements but which deviate from company policy or, in the opinion of the audit team, from good

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environmental management practices and present potential liabilities. The report will also include recommendations for managing identified problems.

Section II includes the overall audit teams' opinion and specific audit findings by functional area. Within each functional area this report will provide information on the current status of noted issues, findings, observations and exceptions from the current audit, and recommendations. All exceptions include a recommendation specific to that exception. The audit findings also will include observations of other items that, in the opinion of the audit team, meet or exceed good management practices or regulatory requirements; these items will be identified as "Observations." Finally, each exception includes the response of Company Officers to the exception.

1.2 Engineering Certification

No technical changes have been made in this June 2007 version of the CES Environmental, Inc. Environmental Management Plan.

Responsibility for Discharge Prevention

Mr. Karl Guidry and Mr. Prabhakar Thangudu are the facility Environmental Managers and are responsible for discharge prevention as required under 40 CFR 112.7(f)(2).

Plan Amendment

In the event this facility has discharged (as described in CFR 112.1(b)) more than 1000 US gallons of product in a single discharge or discharged more than 42 US gallons of product in each of 2 discharges occurring within any 12 month period, CES Management will report the information per 112.4, review the circumstances causing the event and amend this plan as necessary. Every five years the Environmental Management plan will be reviewed for completeness by CES Management and amended as necessary. Further, all future modifications and changes in operations at the CES facility which materially affect this plan will be incorporated into a revised plan within 6 months after such changes occur per 40 CFR 112.5.

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HSE Manager

2.0 FACILITY EXCURSIONS PROTECTION

2.1 Facility Layout Description 40 CFR 112.7(a)(3)

CES Environmental Services, Inc. provides compliant, safe, innovative and cost-effective hazardous and non-hazardous waste management solutions for the petrochemical, manufacturing, and other industries, as well as municipalities in the Houston, TX area. The company started in 1999 with the goal to provide excellent service and competitive pricing in the environmental services industry. Their services include hazardous and non-hazardous waste sampling, analysis and classification, packaging, transportation and disposal, recycling alternatives, tank and sump cleaning services, remediation services, pressure washing services, chemical cleaning services, small scale emergency response, small scale demolition services, fuel filtration, training, and regulatory assistance.

The CES plant is located at 4904 Griggs Road in southeast Houston, Texas. The nearest navigable water body is the Macgregor Bayou which is located to the northwest of the facility. Macgregor Bayou discharges into the Houston Ship Channel and thence to Galveston Bay.

The facility is constructed to contain precipitation which falls within the areas which have product storage as well as any equipment that uses petroleum products in the normal course of operations. Storm water may flow off of the property uncontrolled from parking areas and plant entrances. In the event of a product excursions or release, it is possible that product may be carried off-site with storm water but highly unlikely due to the construction of the plant site drainage system and the product control procedures employed at the site.

Based on review of the Texas Commission for Environmental Quality (TCEQ) Coastal Region Excursions Response Map series, there are five water intakes within 5 miles downstream of Macgregor Bayou entrance into the ship channel. No other environmentally sensitive areas were identified within 5 miles downstream of the facility.

Petroleum based materials which may be stored at the facility include:

- Diesel Fuel
- Light Ends
- Lubrication Oil
- Oily Wastewater
- Used Oil
- Lubricating Oil
- Filter Press Cake.

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HSE Manager

2.2 Storage Areas

Product is stored in fixed tanks, portable tanks and in drums in several locations throughout the site.

All fixed product storage tanks are steel vessels constructed on concrete or gravel pads with concrete curbs or walls or earthen containment dikes. Portable tanks and drummed materials are stored on concrete pads equipped with containment curbs or collection troughs. Process water and areas of potentially contaminated storm water are discharged from this facility after receiving appropriate treatment and thence to a publicly owned wastewater treatment facility (POTW). Storm water runoff from some areas of the facility discharges to drainage ditches and thence to navigable waters and is the most probable route, though still a remote possibility, that would result in the release of petroleum based products to the environment from the facility.

The product storage tanks at the facility are identified in the following table. This table includes the location and storage capacity of each tank as well as the type of secondary containment used to prevent potential releases to the environment.

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TABLE 2-1
PRODUCT STORAGE AREA SUMMARY

STORAGE UNIT	LOCATION	CAPACITY (Gallons)	DATE OF SERVICE	MATERIAL	SECONDARY CONTAINMENT
Waste Mgmt Unit 101		2000	2002	Welded Steel	Concrete Curb
Waste Mgmt Unit 108	CWT	6500	2005	Welded Steel	Concrete Curb
Waste Mgmt Unit 110	CWT	6500	2005	Welded Steel	Concrete Curb
Waste Unit Mgmt 111	CWT	6500	2005	Welded Steel	Concrete Curb
Waste Mgmt Unit 112	CWT	6500	2005	Welded Steel	Concrete Curb
Waste Mgmt Unit 113	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 114	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 115	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 116	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 117	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 118	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 119	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 120	CWT	6500	2005	Welded Steel	Concrete Building Wall
Waste Mgmt Unit 121	CWT	6500	2005	Welded Steel	Concrete Building Wall

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Waste Mgmt Unit 122	CWT	6500	2005	Welded Steel	Concrete Building Wall
---------------------	-----	------	------	--------------	------------------------

¹ Precipitation volumes are based on 8.5 inches of rain

² Precipitation volume and containment capacity will be determined during modification of secondary containment system; see compliance schedule.

2.3 Discussion of Site Product Prevention

Prevention of product discharge due to excursions from product storage areas at the facility are accomplished at the various storage locations as described below:

- Diesel Fuel Tank and Unleaded Gasoline Tank - These two tanks are elevated horizontal steel tanks each having a attached hose and nozzle used for delivery of fuel to vehicles, machinery and/or portable tanks. Both tanks are 500 gallon capacity and are supported on independent steel frames. These are stand alone tanks and the only way to fill these tanks is through a filling nozzle at the top of each tank from a bulk diesel fuel delivery truck. The fueling nozzles are placed into overhead hangers when not in use which are inside the containment area. The diesel fuel storage tanks are contained in a concrete secondary containment system designed to contain any diesel fuel excursions from these tanks. Level indication is by line of sight as the tanks are being filled, the filling operator must physically place the filling nozzle into the tank filling port and visually verify the container level through this port as it is filled.

Operating personnel are present the entire time the tanks are being filled from a bulk diesel fuel delivery truck and can immediately stop the tank filling if there are any leaks from the tanks or the delivery truck. Any tank leaks or excursions are contained by the secondary containment system that the tank is located in. Any tank loading or offloading activities that would result in leaks or excursions will be contained by portable excursions containment materials that will be available at the loading site during any offloading or loading activities. Operating personnel are present during any plant equipment tank filling activity. A large excursion outside of the containment area will be contained by blocking the area drain that directs area runoff to the retention ponds and cleaned at the local excursions site. As a final protective barrier any excursions of diesel fuel that escaped the immediate area will be contained where it can be disposed of with the use of absorbent materials.

A floating product retention boom will be maintained across the surface of the spill

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Waste Mgmt Unit 122	CWT	6500	2005	Welded Steel	Concrete Building Wall
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A floating product retention boom will be maintained across the surface of the spill

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area to prevent any petroleum products that have been allowed to bypass the secondary containment systems and portable absorbent retention systems employed during routine operations and maintenance activities. This boom will be designed to prevent any product from being leached to the off site POTW facility from a product leak that was not immediately discovered. Operating personnel secure the retention booms immediately upon the discover of any product leak to contain any product that may have been able to enter the public storm water drains..

- Waste Product Tank - This steel walled storage tank is a stand alone tank with a capacity of 2000 gallons and is interconnected with Tank Wash plant systems. Tank level is controlled manually by the operating personnel directly at the tank location. The only way to get contents in is through the fill opening on the top of the tank itself. It is a self contained system which is also used to provide secondary containment for drums of used product. The area is located in a covered building which prevents all volume of rainwater from entering the containment system. The tank is emptied to a third party waste product service bin periodically for disposal.

- Drum Storage Area - South Plant - This drum storage area has a capacity of 400 drums (22,000 gallons). The area has a concrete base with curbs on three sides and is sloped toward a drainage trench which directs any fluids to the waste water treatment system handling tanks, each having a capacity of 6,500 gallons. The drum facility is covered; therefore no volume of storm water is expected to enter the trench or sump.

- Drum Cleaning Product Storage Tank - This tank is a steel walled tank with a capacity of 5,000 gallons. It is used for the retention of drum cleaning process effluent. It is enclosed in a building which has concrete floors and walls and a built in a sump to contain excursions and leaks of effluent.

A pump and piping interconnect this tank to the facility Centralized Wastewater Treatment system which provides the capacity to absorb the entire contents of this tank in the event of catastrophic failure.

This system is normally in service during daily operations; it is also used during a neutralization process and is monitored continuously by operations personnel at any time it is in use. Prior to using the transfer system to transfer product a pre job safety and operational analysis will be conducted by the operating personnel and the Drum Facility Manager, which will include the review of the system layout and transfer procedure.

Any tank loading or offloading activities that would result in leaks or excursions will be contained by portable excursions containment materials that will be available at the loading/unloading site during any loading/unloading activities. Operating personnel are present during any loading/offloading activity. All safety precautions will be adhered to as if it were a chemical offloading with the exception of the protective chemical PPE and dilution water availability per the CES Environmental, Inc. chemical offloading procedure.

A large excursion outside of the containment area will be contained by blocking the area drain that directs area runoff and cleaned at the local excursions site. As a final protective barrier any spilled product that escaped the immediate area will be contained where it can be disposed of with the use of absorbent materials. Small amounts of product may be stored in other areas within the facility. Storage at these other locations is generally only temporary storage related to ongoing maintenance activities.

Maintenance personnel are also directly responsible for conducting maintenance activities involving any product based activities in accordance with the Environmental Management Plan. Spill kits and absorbent materials and drain blockage pads are required to be in the immediate area of the maintenance activity for the exclusive use of stopping and minimizing the spread of any product excursions that may occur during the maintenance work. All maintenance activities will be communicated to the area operator prior to the work commencing.

3.0 SECURITY MEASURES 40 CFR 112.7 (g)

3.1 Security

The entire CES facility is enclosed by a six foot high hurricane fence with barbed wire across the top. Operations personnel provide daytime surveillance and control access to and from the facility. During other times, access is limited to plant personnel by card readers or by remote access from the Administration Building. In addition to Operations personnel, surveillance cameras are located within sensitive areas of the facility and entrances to specific portions of the facility. Because entry into the entire facility is restricted and is manned 24 hours a day and all areas of the plant are inspected several times daily, locks on individual drain valves and other excursions control devices have not been installed and is a deviation from 40 CFR 112 (g). The 24 hour operations and positive control of all product systems by operating personnel provides equivalent protection for requirements of 40 CFR 112 (g) and provides reasonable certainty that excursions will not occur from unauthorized operations. The plant has been operating for 5 years at its present location and has not had any incident due to any security breach that would have had the potential of an product discharge.

Environmental Management Plan
June 2007

Written by Karl Guidry
HSE Manager

3.2 Lighting

The operational areas, including facilities with product and waste storage, of the CES facility are adequately lit at night, to detect excursions or leakage.

3.3 Excursions Containment Devices

All significant product storage areas have dikes enclosing the tanks or drums. Diked areas used to store product or hazardous material have outlet piping with valves or sumps with manually activated pumps to allow drainage of rainwater. The valves are kept closed and the pumps turned off except to remove rainwater. Removal of accumulated rainwater from diked areas is allowed only after a trained individual has inspected the containment area and determined that no product or hazardous materials are present. Before approval, this trained individual will visually inspect this diked area to be drained. Drainage will only be allowed if no remedial action is necessary. Accumulated storm water is to be removed to the facility waste water treatment system. Records of any discharges from the secondary containment areas will be kept in accordance with 40 CFR 112.12 (c)(3)(iv).

4.0 FACILITY INSPECTIONS

4.1 Inspections

Each of the facility's above ground storage tanks, collection sumps and containment systems will be visually inspected as well as using non destructive testing on storage tanks annually. This inspection will include at the minimum the following:

- o Evidence of leaks or excursions (ie. product sheen)
- o Rusted areas on tanks and piping
- o Structural integrity of tank and containment system
- o Breathing vent condition
- o Hoses and associated connections
- o Valving
- o Condition of paint
- o Condition of tank supports
- o Integrity of joints in containment system

The inspectors observations will be recorded on the "Annual Tank Inspection Form" provided in this section. Corrective action for potential problems detected during the inspection will be taken as necessary and will be recorded on inspection forms.

The above ground storage tanks will be inspected with non destructive testing methods on an annual basis in accordance with 40 CFR 112.8 (c)(6). The results of these inspections are to be kept in the facility records and compared each year for any signs of deterioration.

Facility area operations personnel are directly responsible for excursions prevention in their areas as well as complying with the Environmental Management and Storm Water Pollution Prevention plans implemented at CES Environmental, Inc. Operations personnel are responsible for making visual inspections of their areas

during normal daily rounds, these inspections fulfill the requirement of frequent inspections required under 40 CFR 112.8 (c)(6). The daily inspection will include the following:

- o Evidence of excursions or leakage
- o Condition of excursions containment system
- o External tank appearance
- o Integrity of containment dikes
- o Contents (if any) of diked areas
- o Adequate aisle and work space in storage areas
- o Condition of facility drainage and diversion structures
- o Supply of excursions control supplies and equipment

Daily inspections will be performed during normal operations area equipment monitoring rounds by the operations personnel. Any leaks or abnormal conditions are to be noted in the operations logs and any corrective actions required are to be taken immediately upon discovery of the condition. All actions taken should be in accordance with this Environmental Management plan. Areas are inspected at least once during an operating shift, normally having 2 operating shifts in a 24 hour period.

5.0 PERSONNEL TRAINING

Product Handling Personnel at the CES facility will receive training from the Environmental Manager of the CES facility to familiarize them with the Environmental Management plan. The Environmental Manager will periodically review the product handling practices and procedure with the product handling personnel as well as the Environmental Management plan requirements at a minimum annually.

6.0 PRODUCT EXCURSIONS RESPONSE PLAN

This portion of the plan provides the response procedures and those responsible to ensure they are carried out for any product excursions event or release to limit the harmful effects of a excursions to the environment. Response will vary during each excursions or emergency event, since each event is unique. As such, no one plan can specifically address all of the different scenarios that can occur during or after a excursions or release of product or waste at this facility, however, based on the product secondary containment systems and the drainage of the site to the city storm water drains, the following procedure would be adequate for all likely excursions events that could occur during normal operations at the facility. Generally, the CES facility could have four types of excursions events:

- 1) Contained Excursions - excursions inside bermed areas and all material is contained.
- 2) Contained Small Excursions - excursions outside bermed areas but is small enough not to spread off-site.
- 3) Uncontained Excursions - that is, a excursions of product or waste large enough to exceed bermed capacity (possibly due to rainfall or fire fighting water) or the excursions is outside of bermed area, and the excursions goes off site.
- 4) Reportable Excursions - the excursions leaves the property, is over 1,000 gallons, or the reportable quantity for any material has been exceeded.

Personnel safety is still the first priority in any excursions or emergency situation. Safety regulations and precautions must be observed at all times during a excursions response.

6.1 Objectives

The TCEQ regulation 30 TAC 327.5 requires that the following actions must be taken during any excursions event. They are:

1. initiating efforts to stop the discharge or excursions;
2. minimizing the impact to the public health and the environment;
3. neutralizing the effects of the incident;
4. removing the discharged or spilled substances; and
5. managing the wastes

6.2 Equipment Location

The facility keeps emergency excursions kits at the following locations;

- Product excursions kits are located in several places;
 - One in Water Treatment Building
 - Several kits positioned on the tanker line
- Chemical excursions kits are located in several places
 - One in Water Treatment Building
 - Several kits positioned on the tanker line

Extra supplies of absorbent product pads are kept in the stores warehouse in the Administration Building.

6.3 Excursions Response

The following procedures apply to excursions of product at the facility.

INITIAL EXCURSIONS RESPONSE

A. The person who first detects an product excursions will:

1. Immediately notify the Facility Yard Manager by phone or other available means
2. Immediately stop any operations or maintenance activity that is contributing to the cause of the excursions
3. Take all action that can be accomplished safely to stop the excursions at the source of the

excursions

4. Take all action that can be taken safely to stop the spread of the spilled material, this is to include stopping the spill at the entry to the site drainage system as quickly as possible, drain blocker pads should be available with the excursions kits.
5. With the exception of retrieving spill control materials stay at the site of the spill until it is cleaned up or others have arrived to help with the spill.
6. Isolate the spill area to prevent any spilled material from being tracked outside of the initial spill area
7. Determine if the spill has entered the retention area and contaminated the storm water, if it has entered the storm drain ,place booms around the storm drains
8. Begin the process of cleaning up the spill from the facility by using product absorbent materials
9. Care must be taken to dispose of oily water as used product and to properly dispose of absorbent materials in a manner that does not spread product contamination ie; placing all used materials in plastic bags at the scene
10. Properly dispose of all spilled materials as waste product and recycle or dispose of any absorbent materials after the absorbed product has been wrung out into the waste product tank
11. An incident report must be filled out within 24 hours of discovery of the excursions

B. Facility Yard Manager Actions

1. When notified of a excursions on site immediately alert all plant personnel by way of PA System
2. Note time of start of excursions in facility log book
3. Shut down any equipment requested by the area operator where the excursions has occurred
4. Take all necessary actions to protect the plant and plant personnel as dictated by the excursions incident
5. Assist in getting all required help to the excursions site
6. Regularly keep in contact with the personnel responding to the excursions and request status updates during the excursions incident
7. Determine if the excursions requires immediate notification to the President or Environmental Manager, small excursions that were easily contained and cleaned up with no damage to equipment or discharge out of the immediate area of the excursions and had no storm water contamination and no personnel injuries do not have to be immediately reported. All other excursions must be immediately reported to a Vice President or the President
8. After the excursions is contained and the excursions clean up is under control and all plant operations and personnel are out of any danger gather your shift personnel together for information gathering to be used in the incident report
9. It is the Facility Yard Manager's responsibility to ensure an incident report has been filled out within 24 hours of the incident

C. Environmental Manager and Vice President Actions

1. Upon notification of a excursions ask if product procedure in Environmental Management plan is being followed
2. Gather as much information about the situation as possible with known facts
3. Ask if operations team feels they need outside assistance or if it can be handled by on site personnel
4. Ask if there are any personnel injuries
5. Ask if the excursions has been contained on site

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6. If being notified off site make determination based on above information if supervisory presence is required on site and take any appropriate actions based on information gathered
7. If on site go to excursions scene to evaluate
8. Assist in incident investigation
9. Ensure proper disposal of all excursion materials and clean up materials
10. Determine if excursions is reportable, if so ensure all reports are made to TCEQ and EPA authorities within 24 hours of incident

6.4 Other Considerations

6.4.1 Drum Leaks - If a leaking drum is detected, the contents remaining in the drum can be transferred to an intact drum if this can be done safely and in a timely manner. Be sure that the drum materials are compatible before transferring any contents. If the leaking drum is not in a containment area and it is sitting next to one, place the drum in the containment area as soon as possible to contain any further leaks.

6.4.2 Clean up Materials Use of proper absorbent and materials for product cleanup and the minimization of the generated waste is an important consideration in a product excursions clean up. EPA guidelines are provided in this section of this plan to help determine proper material selection. Cleanup Guidelines are provided in the Proper Waste Disposal section.

7.0 REPORTING

7.1 Excursions

When a discharge of diesel, product or any other product leaves the property or the Reportable Quantity (RQ) of any material has been spilled/released at the facility; a REPORTABLE excursion has occurred. The person discovering the excursions along with the Environmental Manager or Area Vice President will evaluate the situation to determine if the excursion is a reportable excursion. EPA and state guidelines are provided in this section to aid you in the proper determination for a reportable excursion as well as follow up actions in the event the excursion is reportable.

If the excursion is a reportable event, the Facility Yard Manager or the Environmental Manager or the Vice President of the area will call National Response Center and the Texas Commission On Environmental Quality to notify them as soon as possible but no later than 24 hours after discovery of the excursions by phone, according to regulatory requirements. Attachment No. 5 in this section includes the information normally requested by the receiving agency.

The EPA requires that whenever the facility has "discharged more than 1,000 gallons off property in a single excursions event or discharged harmful quantities, as defined in 40 CFR 110, in two excursions events occurring within any twelve month period..." the owner or operator of the facility must file a written report of the incident and include a copy of the facility's Environmental Management plan.

The TCEQ requires that any excursions of 25 gallons or more of petroleum product to the land be reported to them. Any excursions of petroleum product which creates sheen on the water must also be reported.

Product Excursions Notification Procedures

In general the requirements for excursions response and agency notification consists of contacting the EPA and TCEQ, the specific requirements are contained in the regulations provided in this section and need to be reviewed to ensure all required reporting has been made. :

The following contact information can be used to notify the Texas Commission On Environmental Quality and EPA.

- Local Police and Fire Departments if evacuation is required (911),
- Texas Commission On Environmental Quality (800) 832-8224
- National Response Center (1-800-424-8802)

If outside assistance is needed for any cleanup activities a list of companies is provided in Attachment 3 in this section with contact information.

Instructions for Form TNRCC-10360-xx

Upset or Maintenance (U/M) Notification Form for Reportable Events

INTRODUCTION

Use of this form is optional

The purpose of this form is to help companies ensure that all necessary information is included when reporting a *reportable upset or maintenance/startup/shutdown (M/S/S)* event, as defined in 30 TEX. ADMIN. CODE Chapter 101, General Rules ('the rules'), to the Texas Natural Resource Conservation Commission (TNRCC, or 'Commission'). This form can also be used to report the event to a local air pollution control program with jurisdiction where appropriate.

Rules Relating to Upset and Maintenance

It is strongly advised to always refer to the most current version of the applicable rules when preparing and submitting any required information.

These instructions are for guidance only. Always follow the rules relating to upset and maintenance reporting which are found in the following sections of Chapter 101:

- §101.1, relating to Definitions,
- §101.6, relating to Upset Reporting and Recordkeeping Requirements,
- §101.7, relating to Maintenance, Start-up and Shutdown Reporting, Recordkeeping, and Operational Requirements, and
- §101.11, relating to Demonstrations.

These rules are available for download from the TNRCC Web site as follows:

<http://www.tnrcc.state.tx.us/oprd/rules/indxchap.html#101>

How and Where to Report

The rules require that a report be made for reportable upsets and maintenance activities, but they do not mandate a specific method of making those reports.

A complete report should be submitted to the TNRCC regional office whose jurisdiction includes the site experiencing the event.

The agency preferred way to report an event is by fax utilizing this form. A faxed report form is fast and provides a hard copy record of the report for both the sender and recipient.

Upset/maintenance (U/M) notifications may also be

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made by e-mail or telephone or by other means of communication selected by the sender. The sender should be aware that whatever method is selected, it should meet the requirements of the rules.

A U/M reporting form has been tailored for each region with the region specific contact information in the form header. You can always get an up-to-date listing of the regional offices, including their mailing addresses, fax numbers and e-mail addresses, at the agency Web site:

<http://www.tnrcc.state.tx.us/admin/directory/region/reglist.html>

Accuracy and Completeness are Important

Regardless of the method of reporting selected, providing all the information on this form will help Upset emissions may be exempted from compliance with air emission limitations established in permits, rules, and orders of the Commission, or as authorized by the TEX. HEALTH & SAFETY CODE §382.0518(g) provided an adequate demonstration is met. For upsets one of the criteria in such a demonstration is compliance with the reporting requirements related to 30 TEX. ADMIN. CODE §101.6. For maintenance/start-up/shutdown events the reporting requirement is found in 30 TEX. ADMIN. CODE §101.7.

When to Report

Companies experiencing reportable upsets are required to submit an initial report within 24 hours of the discovery of the upset. In some circumstances, a final report is required to be submitted within 2 weeks after the end of an upset. See 30 TEX. ADMIN. CODE §101.6 for the exact requirements.

Companies planning maintenance, startup or shutdown events that may cause the release of unauthorized emissions above the reportable quantity are generally required to submit a notice at least 10 days prior to the planned event. There are exceptions to this deadline as well; however, notification is always required prior to initiation of the event. Consult 30 TEX. ADMIN. CODE §101.7 for exact requirements.

COMPLETING THIS FORM

General Directions for the Form

- Be as specific as you can. It will help reduce the need for additional requests for

assure that the agency can:

- attribute the event to the proper site and process/emission unit at that site.
- understand the nature, duration and magnitude of the event in terms of air contaminants involved.
- understand the steps the company has/is taking to minimize the impacts and/or correct the situation.
- know who to contact for additional information, should that be necessary.

Benefit to the Company information.

- If a field on the form does not apply to the specific situation at hand, mark it N/A.
- The form is designed to serve as an initial or final report for an event that has occurred (upset) or as a notice that one is planned to occur (maintenance, startup, or shutdown). Please complete it according to the relevant timing and event situation.

Field Specific Instructions

Each field on the form is described below.

Company, Site, Account and Contact Information

Please provide the company name, site name, and account number for the site where the event has occurred, or in the case of a M/S/S event, is expected to occur. In addition, list the name and phone number of the person making the notification and the name and phone number of the person that should be contacted for additional information about this event.

Does this notice constitute the final record for this event?

In some cases, it is necessary for the company to submit several reports related to an U/M event. By placing an 'x' next to the appropriate answer, the company is letting the agency know how to interpret the notification. By placing an 'x' next to the 'yes'

option, the agency will assume that the submitted report constitutes the 'final record' (as defined in the rules) of the event.

A general note on identifying process units and equipment

The rules require that the process and equipment involved in the event be identified in the report. The more specific the identification, the better.

Name of the Facility/Process Unit Involved in the Event

It is always preferable, where possible, to refer to units involved in the event by both their common names (i.e., as the device is known commonly to the facility employees) and to their agency-known identifiers for those same units. Agency known identifiers are typically assigned during the If the site is subject to the emissions inventory requirements of 30 TEX. ADMIN. CODE §101.10 and if the process unit involved in the event is listed in the emissions inventory for the site, please provide the FIN or the EPN, whichever is the more specific for that point of origin for the emissions. If the unit involved in the event does not have an agency identifier (either by virtue of having a permit that includes the unit or being subject to the emissions inventory) then put N/A.

The person responsible for conducting the emissions inventory for the company site can provide the agency known identifiers. The Industrial Emissions Assessment Section of the TNRCC at (512) 239-1773 can answer general questions about the emissions inventory requirements. Their Website is as follows:

<http://www.tnrcc.state.tx.us/air/aqp/psej.html>

Examples of identifying a source involved in an event follow:

Example 1:

Say a site, subject to emissions inventory requirements, with a coatings line commonly known as 'line a' is listed in the air permit number 12345 as "Process A Coatings Line" and in the emissions inventory for that site has a FIN of "LINEA" and an EPN called INCINA. If an upset occurred related to this site and involved emissions from this process due to incinerator malfunction then the:

permitting or emissions inventory processes, based on company desires for those names. Not every unit has agency-known identifiers.

If a source is subject to emissions inventory requirements, the use of the Facility Identification Number (FIN) or Emission Point Number (EPN) is really helpful in clarifying which units are involved in the event. Using these agency identifiers can help in the review of the event by allowing the agency to draw on information previously submitted by the company about the physical and operational characteristics of the units involved. The more the agency can make use of information already in its records, the less the agency will have to ask of the facility in the form of additional information requests.

Facility Identification Number (FIN) or Emission Point Number (EPN)

Process Unit Name:	Line A
Emission Point Name:	Incinerator 2
FIN:	LINEA
EPN:	INCINA

Note that since the FIN has a labeled EPN from which the emissions are emanating, then the appropriate identifier for use on the form would be the EPN.

Example 2:

Say a site *not* subject to emissions inventory requirements has a compressor engine, Engine 4, that has been operating in a consistent manner since 1968. If that unit fails due to a unavoidable and unforeseen mechanical problem and the event becomes a reportable event, then the company would identify that unit as follows:

Process Unit Name:	Engine 4
Emission Point Name:	Blowdown vent
FIN:	N/A
EPN:	N/A

Event Attributed to

Please indicate what type of event is being reported by placing an 'x' appropriately.

Date and Time of the Event

For upsets: Enter the date and time the incident was discovered.

For M/S/S: Enter the date and time the activity is

anticipated to begin.

Use the 24 hour clock (military time) to mark when the event began.

The Event was Ongoing (or is Anticipated to be Ongoing) for an

Please place an 'x' appropriately to indicate whether the duration information provided is "estimated" or "actual" for the event. In addition, provide the total duration in hours and minutes for the event.

Example 1.

If an upset event was discovered at 13:00 hrs on one day and ended at 14:30 hrs on the next day, that event would be indicated as an actual duration of 25 hours and 30 minutes.

Example 2.

The company was planning to take a process unit off line for maintenance. The company expects the maintenance to take approximately 2 days. The maintenance event would be noted here as having an estimated duration of 48 hours and 0 minutes

List the compounds by their names as listed in the rules. For events that create visible emissions, use the term "Opacity" as the compound name.

Estimated Quantity Released

When addressing emissions of any materials (including opacity or visible emissions) report the total quantity of materials estimated to have been released (or anticipated to be released) due to the event. When estimating emissions, one should use the most accurate means of estimation available. Actual monitored values of emissions are preferable when available. Where actual monitored data are not available, then estimation techniques consistent with that used in current emissions inventory guidance is preferred. In all cases, good engineering methodology is expected.

With the sole exception of opacity, these air contaminant compounds must be reported in pounds of unauthorized emissions.

When addressing "Opacity" or visible emissions report the estimated opacity numeric value, but do not include the percent(%) sign. (e.g., 20, not 20%). Note that opacity is generally measured in terms of percent of light blocked by (i.e., not allowed to transmit through) the emissions plume due to the non-moisture related air contaminants in that plume. A perfectly clear plume would normally have "0" % opacity, where as a completely opaque plume (i.e., no light getting through the plume) would have an opacity of "100" %.

Note that the quantity value requested to be reported is quantity above zero, not the quantity above any regulatory limit that may be imposed through rule or permit.

Special Note on Events Involving Opacity

- *Estimating opacity for purposes of reporting under these rules does not require a certified opacity reader to make the estimate.*
- Events that involve opacity must also ordinarily report the other speciated air contaminant compounds

Name of Compounds Released (or Expected to be Released) as a Result of the Event

Note that these are the compounds listed in the definition of reportable quantity (RQ), 30 TEX. ADMIN. CODE §101.1(82), that have been released (or are anticipated to be released) by or through the process unit/emission point noted previously in the report.

A report that constitutes an 'Initial Notification' under the rules requires that **all** air contaminant compounds that were released in amounts **above the reportable quantity** must be reported in terms of total quantity released.

A report that constitutes a 'Final Report' under the rules requires that **all compounds released to the atmosphere, regardless of the RQ** must be reported in total amount released.

If the event involved visible emissions, note that fact in this section (see "Special Notes on Events Involving Opacity" below). Use the number of lines you need, leaving any unused lines blank.

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that were emitted during the event. The rules provide for special opacity reporting requirements for certain types of emission units. See the definition of *reportable quantity* in 30 TEX. ADMIN. CODE §101.1 and special consideration provisions for some boilers and other type units in 30 TEX. ADMIN. CODE §101.6 and 30 TEX. ADMIN. CODE §101.7.

Examples:

For this example, consider that nitrogen oxides (NO₂) has a RQ as defined in 30 TEX. ADMIN. CODE §101.1 of 10 lbs. If a source is normally authorized by permit to emit 160 lbs/hr of NO_x, but during an upset event, emits 175 lb/hr for two hours, then the report would list 350 lbs as the estimated quantity of air contaminant compound released.

Recapping:

Authorized limit: 160 lb/hr NO_x
Upset related release: 175 lb/hr NO_x for 2 hours
RQ for NO₂: 10 lbs
Unauthorized emissions to report: 350 lbs.

To expand on the above example, say that the same emission unit was limited to 15 % opacity by a limit set in either the permit or in 30 TEX. ADMIN. CODE §111.111. Further, let's say that during the same event where excess NO₂ was emitted, the unit operator estimated that opacity was approximately 55% coming from the compressor. The company would report 55% as the quantity value released for opacity.

In summary: For this example reporting the total amount of NO_x released and Opacity experienced is required. NO_x would be reported in pounds while opacity reported as percent opacity.

Cause/Reason for Event:

Required for initial reporting of upset/m/s/s events if know. Must be reported with final reports. The description should be concise but descriptive of the cause of the event. A good description may help avoid additional requests for information from the agency.


Corrective Actions Taken to Minimize Emissions:

This section is required for maintenance events only. Once again, these should be as detailed as possible.

Action Taken to Correct the Upset:

This section is for upsets only. Give as much specific detail as possible. Provide explicit information on how the company brought the unit back into compliance and how unauthorized emission were controlled.

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 <p>Texas Natural Resource Conservation Commission Air Program 5425 Polk Ave., Ste. H Houston, Tx 77023-1486 Phone</p>	Submit Completed Report via :	Fax <i>(preferred)</i>	(713) 767-3799
		Email	upset12@tnrcc.state.tx.us

Upset or Maintenance (U/M) Notification Form for Reportable Events

Company Name		TNRCC Account No.	
Site Name <i>(if different)</i>			
Person Making this Notification		P h o n e	
Contact for this Event <i>(if different)</i>		P h o n e	
Does this notification constitute the final record for this event? <i>(x)</i>		Yes	No

Common Name of Facility/Process Unit involved in the Event				Emission Point Number (EPN) or Facility Identification Number (FIN) <i>(from Site Emissions Inventory or Permit, if any)</i>							
This Event is attributed to <i>(Indicate one)</i>	Upset	The Event Was Initially Discovered (or is anticipated to begin) on	m m	dd	yyyy	at	hh	mm	military time: e.g. 13:00 rather than 1:00 pm	AGENCY USE ONLY	
	Maintenance									E#	
	Startup	The Event was ongoing (or is anticipated to be ongoing) for an <i>(Indicate one)</i>	Actual		time of	hh	mm	a n d	mm	U#	
	Shutdown		Estimated							AGENCY USE ONLY	

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Name (s) of Air Contaminant Compound(s) actually or expected to be released as a result of the Event <i>See instructions for reporting air contaminant compounds.</i>		Estimated Quantity Released <i>(report in pounds or percentage only)</i>
Cause of the Event		
Actions taken to minimize emissions related to the Event		
For upsets only: Actions taken to correct		

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Texas Natural Resource Conservation Commission
Texas Federal Operating Permit Form
PCC
Permit Compliance Certification
(Part 1)

Company Name		Account No.	
Area Name		Op Permit No.	
Certification Period Began on		And Ended on	Report Submittal Date

I. Certification of Continuous Compliance with Permit Terms and Conditions (Indicate response by placing a 'x' in the appropriate column for each of the following questions)	Response Yes No	
With the possible exception of those permit terms and conditions identified in the 'Summary of Deviations' found using, at a minimum, but not limited to, the continuous or intermittent compliance method data from monitoring, recordkeeping, reporting, or testing required by the permit and any other credible evidence or information, was the company in continuous compliance with all the terms and conditions of the permit over the Certification Period?		

II. Summary of Deviations (Indicate response by placing a 'x' in the appropriate column for each of the following questions)	Response Yes No	
A. Were there any deviations from any terms or conditions of the permit during the Certification Period that have <i>previously</i> been reported to the agency? If the answer to this question is 'Yes', please complete Part 2, and attach Part 2 to this page. <i>Important Note:</i> If previously submitted reports did not contain specific information on monitoring methods, frequency and the total number of deviations experienced over the		

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entire certification period, then use Part 3 to provide that information.			
B.	Were there any deviations from any terms or conditions of the permit during the Certification Period that are <i>currently</i> being submitted to the agency?		
If the answer to this question is 'Yes', please include the relevant reports along with this page.			

NOTE: The Responsible Official must certify the information reported in conjunction with this form in accordance with 30 TAC 122.143(16) utilizing form OP-CRO1 (Certification by Responsible Official). Therefore, complete an OP-CRO1 and attach it to this Compliance Certification package and submit the package to the appropriate TNRCC Regional Office.

Texas Natural Resource Conservation Commission
Texas Federal Operating Permit Form
PCC
Permit Compliance Certification
(Part 2)

Company Name		Account No.	
Area Name		Op Permit No.	
Certification Period Began on		And Ended on	Report Submittal Date

Identification of Deviation Reports Submitted During the Certification Period (Note: All reports must be certified to truth, accuracy, and completeness by the Responsible Official)			
Report Date	Report Description (Name of unit, Name of Rule, Driver for report, etc)	Report Submitted To	Report Previously Certified? (Y/N)

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Identification of Deviation Reports Submitted During the Certification Period (Note: All reports must be certified to truth, accuracy, and completeness by the Responsible Official)			
Report Date	Report Description (Name of unit, Name of Rule, Driver for report, etc)	Report Submitted To	Report Previously Certified? (Y/N)

Texas Operating Permit Deviation Summary Report Form

Form PCC (Part 3)

Company Name			Account No.	
Area Name			Op Permit No.	
Certification Period Began on		And Ended on	Report Submittal Date	

[illegible]

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EPAAHO120001809

EPAHO120001811

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Texas Operating Permits Monitoring Options Specification Report
Form PCC (Part 4)

Company Name				Account No.
Area Name				Operating Permit No.
Report Period Began on		And Ended on		Report Submittal Date

[illegible]

Form TNRCC-10360-Instructions (February 9, 2001) C:\DOCUMENTS AND SETTINGS\KLOFTON\LOCAL SETTINGS\TEMPORARY INTERNET FILES\CONTENT.OUTLOOK\ML1Z7EAT\ENVIRONMENTAL AUDIT PROGRAM (2).DOC

EPAHQ120001812

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CES ENVIRONMENTAL SERVICES, INC.

**4904 Griggs Road
Houston, Texas 77021**

MARCH 3, 2005

Waste Treatment, Storage & Disposal Facility Audit

I. CORPORATE DATA

II. SITE DATA

- a. General Site Data
- b. Site Financial/Insurance Factors
- c. Site Environmental Factors
- d. Site Management Factors
- e. Site Permits and Regulatory Factors

III. GENERAL FACILITY STANDARDS

- a. Security
- b. Safety
- c. Emergency Response
- d. Laboratory
- e. Monitoring
- f. Environmental Monitoring
- g. Transportation
- h. Waste Receipt and Shipping
- i. Waste Acceptance

IV. FACILITY CAPABILITIES AND CAPABILITY SCHEDULES (check attached schedules)

- | | |
|---------------|---|
| <u> X </u> | a. Container Storage |
| <u> X </u> | b. Tanks |
| <u> </u> | c. Waste Piles |
| <u> </u> | d. Surface Impoundments |
| <u> </u> | e. Solvent Recovery |
| <u> </u> | f. Carbon Regeneration |
| <u> X </u> | g. Resource Recovery |
| <u> </u> | h. Incineration |
| <u> X </u> | i. Special Waste Physical/Chemical/Biological Treatment |
| <u> X </u> | j. Facility Wastewater Treatment |
| <u> </u> | k. Landform |
| <u> </u> | l. Sanitary Landfill |
| <u> </u> | m. Secure Chemical Landfill |
| <u> </u> | n. Deep Well Injection |
| <u> X </u> | o. Other Facility Capabilities |
- (i.e., Solidification/fixation of incoming waste containing free liquids)

PART “A” SITE PERMIT REQUIRED

BY

II. SITE DATA

e. SITE PERMITS

AND

REGULATORY FACTORS

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Mail to:
Texas Commission on Environmental Quality
Attn: Waste Permits Division
Industrial and Hazardous Waste Permits Section
PO Box 13087 MC 130
Austin, Texas 78711-3087

APPLICATION FOR PERMIT TO STORE, PROCESS, OR DISPOSE OF
NONHAZARDOUS INDUSTRIAL SOLID WASTE

1. Applicant: **CES Environmental Services, Inc.**

Address: **4904 Griggs Road**

City: **Houston, State: Texas Zip: 77021**

Telephone Number: **713-676-1460**

If the application is submitted on behalf of a corporation, please identify the Charter Number as recorded with the Office of Secretary of State for Texas.

Charter Number 01520431 on January 19, 1999.

2. (a) List those persons or firms, to include a complete mailing address and telephone number, authorized to act for the applicant during the processing of the permit application.

Matt Bowman
4904 Griggs Road
Houston, Texas 77021
713-676-1460

Sean Easton
4904 Griggs Road
Houston, Texas 77021
713-676-1460

Currently, Mr. Matthew Bowman is 100% owner of CES Environmental Services. Neither Mr. Bowman, nor CES Environmental Services, has ownership in any other facility in the State of Texas.

- (b) If the application is submitted by a corporation or by a person residing out of state, the applicant must designate an Agent in Service or Agent of Service and provide a complete mailing address for the agent. The agent must be a Texas resident.
NA

3. List the individual who will be responsible for causing notice to be published in the newspaper and his/her mailing address, telephone number and fax number. If e-mail is available please provide an e-mail address.

Sean Easton
CES Environmental Services
4904 Griggs Road
Houston, Texas 77021
713-676-1460/713-676-1676 fax
cesenvironmental@sbcglobal.net

4. For applications for new permits, renewals, major amendments and class 3 modifications a copy of the application must be made available at a public place in the county where the facility is, or will be, located for review and copying by the public. Identify the public place in the county, including the address where the public will make the application available for review and copying.

TCEQ-Region 12 Office
5425 Polk Ave
Houston, Texas 77023

5. Type of Permit for Which Application is submitted:
 a. Original ☒ Permit Number _____
 b. Amendment _____ of Permit Number _____ Page Number _____
 c. Class 1 _____ Class 2 _____ Class 3 _____

6. List any other permits, existing or pending, which pertain to pollution control activities conducted by this plant or at this location.

Permit by Rule Number 15980, City of Houston Sanitary Industrial Wastewater Discharge permit to the Publicly Owned Treatment Works

7. Plant or disposal site information:

Ownership Status
 Federal _____ State _____ Private ☒ Public _____ Other _____

Plant Name: **CES Environmental Services, Inc.**

Street Address, if available: **4904 Griggs Road, Houston, Texas 77021**

County: **Harris**

Are your waste disposal operations within the incorporated limits or extraterritorial jurisdiction of a municipality? **YES** If so, what municipality? **Houston**

Is your industrial solid waste disposal or processing operations in an area in which the governing body of the county or municipality has prohibited the processing or disposal of municipal hazardous waste or industrial solid waste? YES _____ NO ☒

Is the facility located on Indian lands? Yes ___ No ☒

Is the facility within the Coastal Management Program boundary? YES ___ NO ☒

Give a verbal description of the plant or disposal site location with respect to known or easily identifiable landmarks.

The property is located approximately one mile north of South Loop 610, exiting S Wayside Road. It is located approximately one mile north of the 610/Wayside intersection on Griggs Road past the railroad tracks.

8. If there will be a discharge of either process water or storm water, describe the effluent route to the nearest identifiable watercourse.

All process waters will be sent to an approved Treatment Storage and Disposal Facility (TSDF) off-site for processing. All storm water that is collected in the permitted area will also be sent to a permitted TSDF for treatment. Any storm water that falls outside the permitted area will be discharged through the storm sewer and sent to the City of Houston's Municipal Separate Storm Water System. This ultimately discharges into the Houston Ship Channel.

9. Waste Management Units (list each major waste management unit indicating its function [storage, processing, and disposal] and capacity:

There will be three waste management units (WMU) for the permitted activities. They will be WMU #106 (storage), #107 (processing and storage - solids), and #108 (processing and storage - liquids). All WMUs will be located inside a completely enclosed warehouse building.

WMU #106 will be in a completely enclosed area for unloading, staging and storage of drums and other small containers to be processed. This area will have adequate isle spacing, curbing,

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containment and diking to contain any potential spills. WMU #106 will have the capacity to store up to 200 drums of material per day.

WMU #107 will be in a completely enclosed area for processing the like solid materials out of the drums or small containers into 25 yd³ roll-off boxes. This area will have the space to store up to 4, 25 yd³ roll-off boxes prior to shipment offsite to an approved treatment, storage and disposal facility. Free liquids will be vacuumed from containers into the 6,500-gallon poly tank located in WMU #108. This area will have adequate isle spacing, curbing, containment and diking to contain any potential spills.

WMU #108 will be in a completely enclosed area for processing the like liquid materials out of the drums or small containers into a 6,500-gallon poly tank. This 6,500-gallon poly tank will have the capacity to store the material until shipment offsite to an approved treatment, storage and disposal facility. This area will have adequate isle spacing, curbing, containment and diking to contain any potential spills.

10. What estimated date will waste management operations begin; or if operation have begun, what date did waste management operations begin at the site described by this application?

Waste management operations will not begin until the Texas Commission on Environmental Quality approves this permit.

11. Submit an application map or drawing, (Attachment A,) with appropriate scale of this site, which includes the following information:
- a. The approximate boundaries of the tract of land on which the waste management activity is or will be conducted.
 - b. The location of the areas of storage, processing, or disposal.
 - c. The general character of the areas adjacent to the place or places of disposal; for example, residential, commercial recreational, agricultural, undeveloped, etc.
 - d. The boundaries of all affected tracts of land within a reasonable distance from the area of storage, processing, or disposal.

See Attachment A

12. Show on the application map or on a separate list property cross-referenced to item 10-d above, the names, and mailing addresses of all landowners that you have identified as being affected by the activities described by this application.
13. The names and mailing addresses of persons identified as affected parties, item 10 above, were obtained from:

Harris County Appraisal District web site

14. Provide listings of evidence of non-compliances concerning solid waste management by the permit holder in the preceding five years at the permitted site, listings of evidence of non-compliances concerning solid waste management in the preceding five years at any site owned, operated, or controlled by the applicant in the state of Texas, a summary of the attempts of the permit holder to correct the environmental violations, and an indication of whether the permit holder or applicant is indebted to the state for fees, payment of penalties, or taxes imposed by the Texas Solid Waste Disposal Act or by any rule of the Commission.

CES Environmental Services has not had any non-compliance violations for solid waste management activities in the preceding 5 years at this location or any other location in which they have occupied. They are not indebted to the state of Texas for any fees, fines or taxes.

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15. The TNRCC requires that a Core Data Form (Form 10400) be submitted on all incoming applications unless a Regulated Entity and Customer Reference Number have been issued by the TNRCC and no core data information has changed. For more information regarding the Core Data Form, Call (512) 239-1575 or go to the TNRCC Web site at "<http://www.tnrcc.state.tx.us/permitting/projects/cr>"

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Signature Page

I, Matthew Bowman,

I, Sean Easton,

Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: [Signature] Date: 6/6/03

Signature: [Signature] Date: 6/6/03

TO BE COMPLETED BY THE APPLICANT WHEN THE ABOVE STATEMENT IS SIGNED BY AN AGENT FOR THE APPLICANT.

I, _____ hereby designate _____ as my agent and hereby authorize said agent to sign any application, submit additional information as may be requested by the Commission, and/or appear for me at any hearing or before the Texas Commission on Environmental Quality in conjunction with this request for a Texas Solid Waste Disposal Act permit. I further understand I am responsible for the contents of this application, for usage statement given by my agent in support of the application and for compliance with the terms and conditions of any permit which might be issued based upon this application.

Signature: _____ Date: _____

Title: _____

(Application must bear signature and seal of notary public)

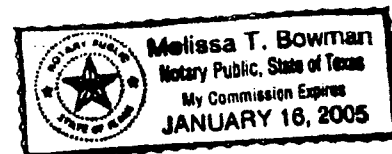
SUBSCRIBE AND SWORN to before me by the said

Melissa T. Bowman On this 6TH day of JUNE, 2003.

My commission expires on the 16TH day of JANUARY, 2005.

Notary Public in and for

HARRIS County, Texas



CORPORATE DATA

1. Company Name and Mailing Address:
CES Environmental Services, Inc.
4904 Griggs Road
Houston, Texas 77021
2. EPA ID No.: TXD008950461
3. Facility Representative: Marlin Moser Facility Phone Number (713) 676-1460
4. Parent Company: CES Environmental Services
5. Year Company Was Established: 1999
6. Owner Land: CES Environmental Services
7. Owner Facility: CES Environmental Services
8. Previous Facility Owner: Use
Suttles Truck Leasing Transportation
9. Original Facility Owner: Use
Younger Brothers Transportation
10. Original Owner Started Facility in: 1946
Current Owner Purchased Facility in: 2002
11. Other Similar Facilities (with locations) Owner/Operated by Current Owner:
None
12. Is waste management, the company's principal business? Yes
If not, describe the Company's principal business (e.g., chemical manufacturing, formulating, distribution, etc.) _____
13. Estimated Percent of Interstate Business: 30 %
Estimated Percent of Intrastate Business: 70 %
14. List names of major generator clients:
PPG, Lubrizol, Atofina, Hydril, Shell, Calpine, etc.

SITE DATA**A. General Site Data**

1. Site Address and Location
(give detail on approach trucks would take to the site):

4904 Griggs Road, Houston, Texas 77021

Southeast side of Houston/inside 610 loop

2. Principal Contact at Site:

Name: Marlin Moser

Title: Business Manager

Telephone No.: (713) 676-1460

Total Site Size: 6.29 Acres

6.29 Acres Number of Acres under Permit

5 Acres Total Area Used Up

5 Acres Total Area In Use At Present Time

1.3 Acres Total Area Available For Expansion

3. Do operations in addition to waste treatment/disposal take place at the site?

YES X NO

If 'YES', list other operations:

- Transportation Services
- Tank Wash Facility
- Waste Transfer Facility Operations

B. Site Financial/Insurance Factors

1. Does the site have Worker's Compensation? YES X NO

Carrier: Texas Mutual Company

2. Does the site have general liability insurance? YES X NO

Carrier: AIG

3. Does the site have an Umbrella Policy coverage? YES X NO

4. Does the site have a funding instrument to cover the amount necessary to close the facility? YES X NO

Amount: \$115,000

Type of Instrument: Corporate Test

5. Does the site have a funding instrument for post closure?
YES _____ NO X (Not required for the type of operation permitted)

Amount: _____

Type of Instrument: _____

****ATTACH A COPY OF ALL CERTIFICATES OF INSURANCE****

C. Site Environmental Factors

1. Nearest neighbors to the site:

Residential: 60%

Agricultural: None

Commercial: 20%

Industrial: 20%

2. Do neighbors use wells for:

Drinking water supply? YES _____ NO X

Industrial water supply? YES _____ NO X

Use municipal water? YES _____ NO X

3. Nearest water resource and its use (select closest stream, river, and/or lake; give distance in miles):

Houston Ship Channel

- 7 Miles

- Water Transportation

4. Nearest water resource used for drinking water, (distance in miles):

Inside City of Houston. City of Houston furnishes drinking water.

D. Site Management Factors

1. Site Employees

<u>40</u>	Total Number of Site Employees
<u>8</u>	Administration
<u>0</u>	Chemists
<u>2</u>	Engineers & Other Technical Professionals
<u>1</u>	Laboratory Technicians
<u>17</u>	Operational/Production Personnel
<u>11</u>	Transport
<u>3</u>	Sales

2. Training

Does the Company have a formal operator-training program?

YES X NO If 'YES', are training records maintained? YES X NO

3. Self-Inspection

Does site perform self-inspections or audits? YES X NO

If 'YES', with what frequency?

Daily/Weekly

4. Site Management

<u>3 Years</u>	How long has current site manager been at this site?
<u>6 Years</u>	With the company?
<u>12 Years</u>	In the waste management business?

E. Site Permits and Regulatory Factors

1. Part "A" Status (attach copy of part "A"):
2. Permit for Industrial Solid Waste Management Site
 Requested: _____ Submitted: 6/6/03
 Permit Issued: 7/24/04 Provisions for Expansion: _____
3. Agency inspection during last year and/or previous ones unsettled: None
 Last Inspection Date: _____ #2 Inspection Date: _____
 Agency: _____
 Violations: _____
 Compliance Plan: _____
 Status: _____
 Restrictions: _____
4. Federal, State, County, or local permits and/or licenses held by the facility or transporter (obtain & attach current copies):

<u>Permit</u>	<u>Issuing Agency</u>	<u>Permit No's</u>	<u>Date Expires</u>
Hazardous Matl Transp	DOT	869392 051203002006LN	6/30/06
Ind Solid Waste Mgmt Site	TCEQ	39048	7/27/14
Water Dischg (to POTW)	City of Houston	6806	1/14/07
Air Emissions	TCEQ	PBR	N/A
Used Oil Processor	TCEQ	A85775	N/A

5. Has the site had formal violation notices or fines? YES _____ NO X
6. How many violations in the last two (2) years? 0

F. Site Permits and Regulatory Factors Continued

7. List violations and dates of issue: None
8. Is the site currently under a compliance agreement or other enforcement action from any environmental regulatory agency? YES _____ NO X
9. If so, summarize:

10. In the Operator's opinion, what is the site's relationship (excellent, good, fair, etc.) with the surrounding community? Excellent
11. With the media? Excellent

GENERAL FACILITY STANDARDS

A. Facility Security

1. Is access to the facility controlled? YES X NO
2. Visitor Passes? YES NO X
3. Visitor Log Book? YES X NO
4. Is the facility fenced in completely? YES X NO
5. Is vehicular traffic controlled? YES X NO
6. Is area lighted? YES X NO
7. Is facility guarded? YES NO X

If 'YES', when is it guarded? (24 hours per day, normal working hours, etc.)

8. Does the facility have:

An internal communications or alarm system capable of providing immediate emergency instructions to facility personnel?

YES X NO

A device at the scene of operations capable of summoning emergency assistance from police, fire department, etc.

YES X NO

B. Safety

1. Does the site have a safety plan covering all site operations?
YES X NO
2. Is medical monitoring of employees conducted?
YES X NO

C. Emergency Response

1. Is the following fire protection equipment available on site?

Pressurized hydrants/monitors	YES <u> </u>	NO <u> X </u>
Fire Truck (Water Truck)	YES <u> </u>	NO <u> X </u>
Chemical/Foam Extinguishers	YES <u> X </u>	NO <u> </u>

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2. How many miles to nearest outside emergency fire protection assistance?
5 Miles (Fire Station)

3. Does site have emergency response agreements with:

Local Hospital	YES <u>X</u>	NO <u> </u>
Police	YES <u>X</u>	NO <u> </u>
Spill Response Contractor	YES <u>X</u>	NO <u> </u>

D. Laboratory Services

1. Which of the following pieces of equipment does the laboratory have on hand?

Gas Chromatograph	YES <u> </u>	NO <u>X</u>
Atomic Absorption Unit	YES <u> </u>	NO <u>X</u>
Mass Spectrometer	YES <u> </u>	NO <u>X</u>
Pensky Martins Flash Tester	YES <u> </u>	NO <u>X</u>
Bomb Calorimeter	YES <u> </u>	NO <u>X</u>
Ventilation Hood	YES <u>X</u>	NO <u> </u>
Other: <u>pH equipment, other test equipment for oil analysis, and wet chemistry lab</u>		

2. What is the laboratory operating hours? 8 a.m. – 8 p.m.
3. What certifications does the laboratory have? None
4. Name the principal chemistry contact on site? Clark Hickman
5. Where does the lab waste go? Off-site disposal (e.g., chemical waste landfill or thermal destruction)

E. Environmental Monitoring

1. Ground Water Monitoring

- a. Is ground water monitoring conducted on site?

YES NO X

 Total number of monitoring wells

 Number of wells downgradient

 Age range of wells

- b. Has monitoring indicated ground-water contamination?

YES _____ NO (No contamination)

If 'YES', describe:

- c. Frequency of Monitoring? _____

- d. Parameters monitored: _____

2. Surface Water Monitoring

- a. Does the site have a water discharge permit?

YES X NO _____

If 'YES', list streams discharged by permit: Storm water, transportation equipment cleaning wastewater, and solid waste management site wastewater

- b. Key parameters tested: TOC, TSS, pH, Oil & Grease, Cadmium, Chromium, Lead, Nickel, Zinc, TKN

- c. Has the site had a chronic or major violation(s) in reference to the discharge permit?

YES _____ NO X

If 'YES', describe:

- d. Does the site conduct any off-site monitoring of nearby rivers, streams, or waterways?

YES _____ NO X

If 'YES', is there any evidence of environmental damage caused by site activities?

YES _____ NO _____

If 'YES', describe:

3. Sewer Discharge Monitoring

- a. Does the site have a permit to discharge to an off-site treatment facility?

YES X NO

If 'YES', describe:

Wastewater can be discharged to the City of Houston POTW.

- b. Is the discharge monitored? YES
- X
- NO
-

If 'YES', what are the key parameters?

Oil & Grease, pH, TSS, TOC, Cadmium, Chromium, Lead, Nickel, Zinc

- c. How often are the samples collected?
- Quarterly

- d. Does automatic, proportional flow sampler monitor discharge?

YES NO X

If 'YES', are the composite samples kept chilled?

YES X NO

- e. Has the site had chronic problems in meeting sewer discharge standards?

YES NO X

4. Air Monitoring

- a. Does the site conduct air monitoring of specific sources?

YES NO X

If so, list sources:

N/A

- b. Is there an automatic shutoff in the event that regulated levels are exceeded?

YES NO X

- c. Does the site conduct ambient air monitoring?

YES NO X

- d. Has monitoring indicated any off-site pollution problems?

YES _____ NO X

If 'YES', describe:

F. Transportation

1. In-house trucking capability

11 Numbers of tractors
33 Numbers of trailers (total)
27 Vacuum trucks or bulk liquid trailers
0 Dumps
2 Vans
2 Roll-Offs
2 Flatbeds
0 Other _____

2. Are trucks rinsed out on site? YES X NO _____

If 'YES', how is the rinse water handled? Water is pretreated and discharged to the City of Houston (POTW) under a discharge permit.

G. Waste Receipt and Shipping

1. Indicate number of each type of receiving/shipping facility:

2 Truck bulk loading/unloading racks
0 Rail car bulk loading/unloading racks
2 Truck drum docks
0 Rail car drum docks
0 Barge slips
0 Ship docks
0 Pipeline

2. Is there a scale to weigh vehicles? YES _____ NO X

3. Do impermeable materials underlie loading/unloading areas?

YES X NO

If 'YES', what materials? Typical concrete slab/foundation construction

H. Waste Acceptance

1. Outline the procedures or sequence of events to accept a new waste:

Generator must submit waste profile data and a representative sample. CES will review the items submitted for determining if the management of the waste is allowed by the permit, if the waste is amenable to the treatment capabilities of the facility, and whether there are any potential safety problems with the waste. CES will conduct tests on the sample to verify waste profile data. The waste will be accepted or rejected based on the results of the review.

2. Does the site have a formal (written) waste analysis plan?

YES X NO

If 'YES', what materials?

Plan evaluates incoming waste streams that are treated by CES.

3. What parameters are used to fingerprint incoming waste?

pH, visual appearance, compatibility testing, waste profile data, and general composition.

4. For a bulk load, how many samples are taken? For liquids – One composite sample.

Are these composite or analyzed separately?

YES X (Composited) NO

5. For a drum load, how many samples are taken? Minimum 10%

6. How is the waste tracked at the facility?

Waste manifests and waste profiles using waste ID numbers assigned using TCEQ procedures

7. Are unloading facilities curbed and/or have collection sumps?

YES X NO

8. Time required to accept a waste stream? 1 Week

FACILITY CAPABILITIES AND CAPABILITY SCHEDULES
 (Check past and present waste management methods at this site)

	Current Practices	Past Practices
A. Container Storage	<u> X </u>	<u> X </u>
B. Tanks	<u> X </u>	<u> X </u>
C. Waste Piles	<u> </u>	<u> </u>
D. Surface Impoundment	<u> </u>	<u> </u>
E. Solvent Recovery	<u> </u>	<u> </u>
F. Carbon Regeneration	<u> </u>	<u> </u>
G. Resource Recovery	<u> X </u>	<u> X </u>
H. Incineration	<u> </u>	<u> </u>
I. Special Waste Physical/Chemical/Biological Treatment (Waste Fuel Burning)	<u> X </u>	<u> X </u>
J. Facility Waste Water Treatment	<u> X </u>	<u> X </u>
K. Land Farm	<u> </u>	<u> </u>
L. Sanitary Landfill	<u> </u>	<u> </u>
M. Secure Chemical Landfill	<u> </u>	<u> </u>
N. Deep Well Injection	<u> </u>	<u> </u>
O. Other Facility Capabilities	<u> </u>	<u> </u>

For each current disposal/treatment method checked, attach the corresponding schedule.

CONTAINERS

1. Estimate the number and type(s) of containers:
- | | |
|------------|-----------------------|
| <u>500</u> | Drums |
| <u>10</u> | Hoppers |
| <u>4</u> | Roll-Off Boxes |
| <u>2</u> | Other (Tank Trailers) |
2. Describe container storage facilities (e.g., in/outdoors, covered or not, run-off/on control, etc.)
- Covered inside metal warehouse with run-on/run-off control
3. Are container(s) placed on an impermeable liner or concrete pad?
- YES X NO _____
- If 'YES', what?
- Containers are placed in a metal building on a concrete pad.
4. Is there a container decanting facility? YES X NO _____
5. What happens to empty containers?
- | | |
|----------|---------------|
| <u>X</u> | Reused |
| <u>X</u> | Reconditioned |
| _____ | Landfilled |
| _____ | Other _____ |
6. Are fiber/plastic drums incinerated? YES _____ NO X
- If 'YES', what is the maximum size of drums incinerated? _____

7. For underground tanks, describe the following: None
- _____ Number
- _____ Capacity (range)
- _____ Age (range)
- _____ Contents (waste/fuel/other)
- _____ Composition (fiberglass/steel/other)
- _____ Construction (enclosed, open-top, prefabricated, constructed in place)
8. Do underground tanks have secondary protection or containment? None
- YES _____ (Not Applicable) X
- If 'YES', describe:
- _____
- _____
9. For all tanks, is a leak detection method used? YES X NO _____
- If 'YES', describe:
- Visual. Tanks are located on concrete pad.
- _____
10. Do tanks have interior protection? YES _____ NO X
- If 'YES', describe:
- _____
- _____
11. Are tanks integrity tested? YES X NO _____
- If 'YES', describe:
- Ultrasonic testing is conducted to determine tank thickness.
- How frequently?
- One per year.
12. Have there been any leaks or spills associated with the site's tanks?
- YES _____ NO X
- If 'YES', summarize the incident(s) and response(s):
- _____
- _____

WASTE PILES

1. What types of wastes are stored?

Not Applicable

2. Describe the waste pile(s): None

_____ Number

_____ Size Range

_____ Impermeable Underlayment

_____ Covered

Wind Protection: _____

3. Do the waste pile(s) have surface leaching controls?

YES _____ NO _____

If 'YES', summarize the incident(s) and response(s):

4. Is soil or ground water monitoring conducted?

YES _____ NO _____

If 'YES', describe the monitoring system:

SURFACE IMPOUNDMENTS

1. Surface impoundment(s) is/are used primarily for: Not Applicable – No impoundments

_____ Storage	How Many? _____
_____ Treatment	How Many? _____
_____ Disposal	How Many? _____
2. Are surface impoundment's to be closed with wastes in place or by removal?

3. Is there a surface water discharge from any of the impoundment's?
YES _____ NO _____
If 'YES', is it permitted? YES _____ NO _____
4. Is there a discharge to an off-site sewer system from the impoundments?
YES _____ NO _____
If 'YES', is it permitted? YES _____ NO _____
5. Is there a lead detection system? YES _____ NO _____
If 'YES', describe:

6. Is there a leachate collection system? YES _____ NO _____
If 'YES', describe:

How much leachate is removed? _____
7. Briefly describe any history or present evidence of releases to the environment:

8. Do lagoons meet RCRA standards? YES _____ NO _____
9. Are the lagoon lined? YES _____ NO _____
10. What type of liner? _____
11. Liner thickness: _____

SOLVENT RECOVERY
(None – Not Applicable)

1. Incoming Waste Solvent

Is waste material received in drums? YES _____ NO _____

Drums are:

_____ New

_____ Used

_____ Combination New/Used

Average number of solvent drums on site:

_____ Full

_____ Empty

What happens to empty solvent drums?

_____ Reconditioned

_____ Landfilled

Give company/site name and location:

2. How is water, which is gravity, separated from incoming waste solvent disposed?

_____ Total Recycle

_____ Sewer

_____ Evaporation Impoundment

_____ Hauled away from disposal. (Give site name and location):

Other, describe:

3. How are still bottoms disposed?

_____ On-Site Landfill

_____ Off-Site Landfill. (Give site name and location):

_____ On-Site Incineration

_____ Off-Site Incineration. (Give site name and location):

4. Outgoing Material

_____ Is reclaimed material re-drummed on site?

_____ Are new drums used?

_____ Are reconditioned drums used?

_____ Do drums meet specifications for transporting flammable liquids?

_____ Type (DOT Designation)

_____ Properly labeled?

_____ Is bulk liquid delivered directly into client's drums at client's plant?

5. Site reclaimed product meets the following specifications:

_____ Pharmaceutical Grade

_____ Government Spec. No.

_____ Semiconductor Grade

_____ Reagent Grade

_____ Commercial

_____ Industrial

_____ Other Grading _____

6. Is facility a member of a solvent recycling association?

YES _____ NO _____

7. Solvents recovered?

Q7

8. Is operation batch or continuous? _____

9. What happens to recovered products?

CARBON REGENERATION
(No Carbon Regeneration)

1. Incoming Carbon

a. Identify the criteria for accepting carbon for regeneration at this site:

Acceptable Contaminants: _____

Unacceptable Contaminants: _____

Acceptable Grades: _____

Any Other Criteria: _____

Is custom regeneration available at this site? YES _____ NO _____

Is preferred segregated storage available? YES _____ NO _____

Is batch regeneration available? YES _____ NO _____

How is incoming carbon QA/QC maintained?

b. Segregation

Is segregation of incoming carbon required? YES _____ NO _____

What are the criteria for segregation?

PCB's: _____

Carcinogens: _____

Ignitable: _____

Reactive: _____

Other: _____

How is segregation maintained? _____

c. Storage of Unprocessed Carbon

Indicate type of storage:

_____ Containers (see Containers Form)

_____ Tanks (see Tanks Form)

_____ Waste Piles (see Waste Piles Form)

Average storage time: _____

2. General Engineering Data

a. Prefeed Storage

PREFEED STORAGE	YES	NO	CAPACITY
Flow Bins			
Bags			
Drums			
Tanks			
Lines Sumps			
Unlined Pits/Ponds/Lagoons			
Slab Curbed			
Slab Flat			
Soil Surface			
Other			

b. Feed System

_____ Batch

_____ Continuous

Hopper YES _____ NO _____

Screw YES _____ NO _____

Conveyer Belt YES _____ NO _____

Other _____ YES _____ NO _____

Q7

c. Dewatering Facilities

_____ Type

_____ Capacity

Where does wastewater go?

What is maximum moisture content of carbon fed to furnace?

d. Furnace System

_____ Dimension of Kiln

_____ Carbon Feed Rate

_____ Expected Carbon Loss

	<u>YES</u>	<u>NO</u>	<u>NUMBER</u>	<u>OPERATING TEMP</u>	<u>FUEL</u>
Multiple Hearth					
Rotary Kiln					
Afterburner					

Average Residence Time:

Describe scrubber system:

Describe quench system, if any:

What is the percent of downtime for furnace system maintenance?

3. Outgoing Material

Is reclaimed material re-drummed on site? YES _____ NO _____

Are new drums used? YES _____ NO _____

Are reconditioned drums used? YES _____ NO _____

Do drums meet specifications for transporting flammable liquids?

YES _____ NO _____

Type (DOT designation) _____ YES _____ NO _____

Properly labeled? YES _____ NO _____

Is bulk liquid delivered directly into client's drums at client plant?

YES _____ NO _____

4. Product Quality Control

Product Name/Number: _____

General Specifications:

_____ Activity (CCI)

_____ Apparent Density

_____ Hardness

_____ Moisture as Packed

_____ Iodine Number

_____ Ash Content

_____ Other Tests _____

Properties:

_____ Surface Area

_____ Pore Volume

_____ Specific Heat at 15°C

_____ pH of Water Extract

_____ Other Water Extract Analyses

Screening:

_____ Mesh Sizes Available

_____ Percent Variation

_____ Extra Charge for Screening

Is product make-up available? YES _____ NO _____

5. Off-Site Waste Disposal

Has the facility received a U.S. EPA Generator I.D. Number?

YES _____ NO _____

List Number: _____

What wastes/by-products are generated from the reactivation process? Also, indicate disposal method and location:

WASTE	DISPOSAL METHOD	LOCATION

Are these off-site facilities the end disposers? If not, what happens to those materials?

Q7

WASTE	END DISPOSERS	YES	NO	FINAL DISPOSER

RESOURCE RECOVERY

1. Brief description of recovery process:
Oil is recovered from oil-water mixtures using acid, heat, chemical, and other treatment.
2. Fate of recovered materials:
Oil returned to a refinery, and sent to energy recovery
3. Ultimate disposal of residues:
Sludge is landfilled in approved, permitted site. Water is treated and discharged to a POTW.
4. Process flow rates:
15,000 gallons/day
5. Process monitoring controls:
pH, level, testing, etc.
6. Percent process downtime: -- %
7. Raw material storage

Storage method: Tanks

Approximate quantity in storage: 15,000

Process time equivalent (in days) for amount in storage: 1 to 2

INCINERATION
(No Incineration – Not Applicable)

NOTE: ATTACH INCINERATOR DIAGRAM TO THIS FORM, IF AVAILABLE

1. General Engineering Data

_____ Capacity BTU/Hr
 _____ Destruction Efficiency (percent)
 _____ Waste Feed Rate Liquids
 _____ Waste Feed Rate Solids or Sludges
 _____ Maximum Size Package for Kiln
 _____ Maximum Solids Content for Liquid Waste

Is there a shredder on site? YES _____ NO _____

Is the vapor recovered? YES _____ NO _____

2. Type: _____

3. Residence Time: _____

4. Method of Injection: _____

5. Process Equipment & Operating Capabilities

A. Primary Chamber: Rotary Kiln/Liquid Boiler/Process Furnace
 Other: _____

Retention Time: Gasses _____ seconds; Solids _____ minute

Start-up Fuel: Natural Gas/Oil/Coal/Supplemental Fuel/
 Other: _____

Operating Fuel: Natural Gas/Oil/Coal/Supplemental Fuel/
 Other: _____

Normal Operating of Main Section: _____

Operating Range: _____

Oxidation/Reduction Atmosphere: _____

B. Secondary Chamber: Rotary Kiln/Liquid Boiler/Process Furnace/Other:

Retention Time: Gases _____ seconds: solids _____ minute

Start-up Fuel: Natural Gas/Oil/Coal/Supplemental Fuel/Other:

Operating Fuel: Natural Gas/Oil/Coal Supplemental Fuel/Other:

Normal Operating of Main Section:

Operating Range:

C. Steam Generation: YES _____ NO _____

Steam Utilization: Process/Heat or Cool/Power Generation:

Used On Site: _____%

Sold Off Site for Use: _____

D. Air Pollution Control: Wet Scrubbers/Dry Scrubbers/Precipitators/Other:

E. Effluent Control: From scrubber quench to

F. Computer Controlled: YES _____ NO _____

Monitored functions: Waste or Fuel Feed/Air Flow/Temperature/Stack Emissions/Other

Automated Emergency Shutdown: YES _____ NO _____

Caused By:

6. Bulk Storage/Receiving Storage Capacity

_____ Tank Storage Capacity

_____ Ponds/Lagoons Storage Capacity

7. Drums Storage/Receiving

_____ Storage Capacity

Drum Decant Facility YES _____ NO _____

Are fiber drums received/required? YES _____ NO _____

Are small containers received? YES _____ NO _____

8. Incinerator Associated Wastes

Describe treatment and/or discharge scrubber water:

Where and how is ash disposed of?

How are empty drums handled?

Percent downtime for refractory liner replacement, etc?

PHYSICAL/CHEMICAL/BIOLOGICAL TREATMENT OF SPECIAL WASTE CATEGORIES

Future Operation – Startup May 2005, Permit No. 9558 City of Houston Under
40 CFR 43 – Centralized Waste Treatment Facility

1. Brief description of waste streams treated (e.g., cyanide waste, heavy metals, organic wastes):
Heavy metals, oil-water streams, and organic streams.

2. Is treatment continuous or batch?

X

Continuous

Batch

3. Describe physical/chemical/biological processes employed:
Heavy Metals Treatment System – Primary chemical precipitation, liquid-solid separation, secondary chemical precipitation, clarification, and filtration.
Oil-Water Streams Treatment System – Primary gravity separation, acid treatment, heat treatment, emulsion breaking treatment, and secondary gravity separation.
Organic Wastewater Treatment System – Equalization, clarification, bio/chemical oxidation, and clarification.

 Then, all three system discharges are bio-treated and clarified in a large City of Houston POTW.

4. What is the process flow rates?

Oil-Water Streams	15,000 gallons/day
Heavy Metal Streams	5,000 to 10,000 gallons/day
Organic Streams	5,000 to 10,000 gallons/day

5. Briefly describe process monitoring controls:
pH, level measurement, pump flow rates, etc.

6. How are treated waste stream and residues ultimately disposed of?
Sludges/solids – sent off-site to landfill.
Oil recovered.
Wastewater to City of Houston POTW

FACILITY WASTEWATER TREATMENT

1. Types of treatment:
Equalization and solids settling, oil/water separation, pH adjustment, and discharge to a POTW to remove dissolved organics and TSS.

2. Is treatment batch or continuous?

_____ Continuous

 X Batch

3. How is resulting sludge disposed?
Sludge is sent off-site to a commercial industrial landfill.

4. Is treated waste discharged to sewer system or surface water?

Yes X No _____

If 'YES', has a permit been obtained? Yes X No _____

Treated wastewater is discharged to the City of Houston sewer system under a discharge permit no. 6806.

LANDFARM
(No Landfarm – Not Applicable)

1. Types of waste landfarmed:

_____ Oily Wastes

_____ Biological Pond Sludges

_____ Metal Sludges

_____ Sanitary Waste Sludge

_____ Other (describe) _____
2. Is soil monitoring performed to prevent excessive metal loading?

Yes _____ No _____
3. Describe waste application methods:

4. Is application rate controlled: Yes _____ No _____
5. How is runoff managed?

_____ Impounded (see Surface Impoundments)

_____ Channelized

_____ Total Retention

_____ Treated on-site for discharge (see Facility Wastewater Treatment)

_____ Sewered for off-site treatment

_____ Other (describe) _____
6. Excess waste storage capacity during inclement weather:

SANITARY LANDFILL
(No Sanitary Landfill – Not Applicable)

1. Landfill primary liner is
 _____ Natural, in-place soil
 _____ Recompacted clay liner
 _____ Synthetic liner
 _____ Combination liner (describe) _____
2. Does the landfill have a leachate collection system? Yes _____ No _____
 If 'YES', where and how is leachate disposed of or treated?

3. Describe vector controls:

4. Does site have methane collection system? Yes _____ No _____
 If 'YES', briefly describe:

5. Are hazardous wastes co-disposed? Yes _____ No _____
6. Are incoming wastes chemically/physically tested? Yes _____ No _____
 If not, is any other screening performed? Yes _____ No _____
 Briefly describe:

7. How wet can the material be before being unacceptable?

8. Who performs the review of waste approvals?

9. Is there any State approval required for special waste? Yes _____ No _____
10. Do they perform any analysis or verification upon acceptance?
Yes _____ No _____
11. Will they accept crushed drums in the dirt or filter cake loads?
Yes _____ No _____
12. Is there any problem with debris in the loads?
Yes _____ No _____
13. Are there special waste regulations in this State?
Yes _____ No _____
14. Will they sign a Certificate of Disposal provided by Republic Environmental Systems, Inc. with each load?
Yes _____ No _____
15. How many acres is the facility comprised of?

SECURE CHEMICAL LANDFILL
No Chemical Landfill – Not Applicable

1. Design & Geology

a. Cell(s) in use have single/double liner(s)?

Yes _____ No _____

Liners Description:

_____ Inches of compacted _____ Clay: On bottom/on sides/ _____ cap;

_____ Miles of _____ (synthetic): On bottom/on sides/ _____ cap;

_____ Inches of compacted _____ Clay: On bottom/on sides/ _____ cap;

_____ Miles of _____ (synthetic): On bottom/on sides/ _____ cap;

Other:

b. Closed cells have single/double liners?

Liners Description:

_____ Inches of compacted _____ Clay: On bottom/on sides/ _____ cap;

_____ Miles of _____ (synthetic): On bottom/on sides/ _____ cap;

_____ Inches of compacted _____ Clay: On bottom/on sides/ _____ cap;

_____ Miles of _____ (synthetic): On bottom/on sides/ _____ cap;

Other:

c. Closed cell(s) have leachate collection? Yes _____ No _____

If 'YES', describe:

- d. Cell(s) have leachate collection? Yes _____ No _____
If 'YES', describe:

- e. _____ Cells under construction
With leachate collection? Yes _____ No _____
If 'YES', describe:

- f. Lower cell liner
_____ Feet to surface
_____ Feet to groundwater
_____ Feet to useful aquifer/bedrock
- g. Type of soil(s) beneath the site (including permeability's):

- h. Special design features:

- i. Run-off control; within cell(s)

Around each cell _____
Around site perimeter _____
- j. Attach sketch of cell layout, existing & planned
2. Are drummed wastes landfilled? Yes _____ No _____
Placed in segregated areas? Yes _____ No _____
Empty drums crushed? Yes _____ No _____

3. Solidification provided on-site? Yes _____ No _____

If 'YES', (use Appendix A)

Maximum delay, acceptance to placement in cell? _____ Hours

4. Daily Cover:

_____ Inches of cover for every;

_____ Inches/Feet of Waste, Cover Material

From on site? Yes _____ No _____

5. Interior access roads: Dirt/Gravel/Paved

Wheel Wash? Yes _____ No _____

6. Estimated remaining life of facility?

Part A _____ Years

Part B _____ Years

Adjacent land owned/optioned for expansion? Yes _____ No _____

If 'YES', how many acres? _____

7. Operational provisions for adverse weather conditions?

Yes _____ No _____

If 'YES', covered cell/reduced/operations/stop operations/use alternate site other:

8. Is waste segregated and/or classified?

_____ Segregated

_____ Classified

9. Is there a price reduction based on volume? Yes _____ No _____

If 'YES', please define:

DEEP WELL INJECTION
(No Deepwell – Not Applicable)

1. _____ Age of well
2. Is well designed for disposal or converted?
 _____ Designed for disposal
 _____ Converted
3. _____ Depth of well
4. _____ to _____ Depth interval(s) of injection zone(s)
5. Is mechanical integrity of well verified by testing?
 Yes _____ No _____
 If 'YES', what methods and the frequencies?

6. Mechanical integrity monitoring:

	Capability	Working
Injection Pressure	_____	_____
Annular Pressure	_____	_____
Annular Temperature	_____	_____
Other (summarize method)		

7. Groundwater Monitoring:

	Capability	Working
Upper Aquifer	_____	_____
Lower most potable quality aquifer	_____	_____
Other (briefly describe)		

8. Well Workovers/Repairs

Total Number

Most Recent Date

Annual Downtime

Excess storage capacity expressed as days of downtime



RasGas Company Limited

CONTRACT

FOR

**SULFIDIC CAUSTIC SOLUTION
RECEIVING & HANDLING SERVICES
AND REMOVAL & TRANSPORTATION SERVICES**

CONTRACT NO.: CT/RG08/L247/08

CONFIDENTIAL

Y

EPAHO120001861

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SECTION 1.0

FORM OF AGREEMENT

A handwritten signature in black ink, appearing to be 'G. i.' with a flourish.



THIS CONTRACT made between

RASGAS COMPANY LIMITED, a company established under the laws of the State of Qatar with a registered address of P.O. Box 24200, Doha, Qatar, for and on behalf of itself or acting as agent for either Ras Laffan Liquefied Natural Gas Company Limited, Ras Laffan Liquefied Natural Gas Company Limited (II), Ras Laffan Liquefied Natural Gas Company Limited (3), Qatar Liquefied Gas Company Limited, Qatar Liquefied Gas Company Limited (II), ExxonMobil Middle East Gas Marketing Limited ("AKG"), and any other entity or project for which RasGas Company Limited may provide services ("RasGas" or the "Company"), and

CES ENVIRONMENTAL SERVICES, INC. a company established under the laws of United States of America with registered address 4904 Griggs Rd., Houston, TX 77021, USA (the "Contractor")

entered into by the parties the earlier of (a) the date of the RasGas Letter of Acceptance or (b) the day by which the Contract has been signed by both parties' duly authorized representatives, is effective from **1st December 2008**.

THE PARTIES AGREE AS FOLLOWS;

1. This Contract includes all of the following documents listed, and as they may be amended from time to time. In the event of any inconsistency or contradiction in terms between listed documents, the Section number indicates the order of precedence and determines which document prevails.

In addition, if Special Terms and Conditions agreed in writing are not merged into Section 2.0 below, then they prevail over Section 2.0.

Section 1.0	Form of Agreement
Section 2.0	General Conditions
Section 3.0	Scope of Services
Section 4.0	Compensation
Section 5.0	Preliminaries & Coordination Procedures / Forms
Section 6.0	Not Used
Section 7.0	Environment, Health and Safety Requirements
Section 8.0	Bonds & Guarantees

2. Any notice by either party to the other concerning the Contract shall be in writing and be deemed received only when actually delivered either by hand or by mail to:

Contractor at: CES Environmental Services, Inc.
4904 Griggs Rd., Houston, TX 77021
Tel: +1 713 676 1460
Fax: +1 713 676 1676

Company at: Attention: Mr. Ramiz Tafilaj, Vice President- International Business
RasGas Company Limited
P.O. Box 24200
Doha
State of Qatar
Attention: Manager, Commercial & Shipping



In the event of a change of address, prompt notice shall be given by the party concerned to the other.

3. This Contract continues in effect, unless terminated earlier in accordance with its terms, until the Date of Completion of Services; provided, however, that any provisions whose enforceability requires survival (including without limitation warranties and audit rights) shall survive accordingly.
4. The Contractor agrees to deal only with RasGas Company Limited in relation to all matters arising under the Contract, and RasGas Company Limited shall be entitled to enforce this Contract on behalf of itself or any entity for which it acts as agent.

IN WITNESS whereof the parties have signed this Form of Agreement in two originals on the date(s) mentioned below.

For: RASGAS COMPANY LIMITED

For: CES ENVIRONMENTAL
SERVICES, INC.

Name: Nasser M. AlNaimi

Name: RAMIZ TAFILAJ

Signature: [Signature]

Signature: [Signature]

Position: Commercial & Shipping
Manager

Position: V.P. INTERNATIONAL

Date: 30-Nov-2008

Date: 12-9-08



SECTION 2.0

GENERAL CONDITIONS

CONTRACT SERVICES

Handwritten signature/initials



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GENERAL CONDITIONS

1. INTERPRETATION

1.1 Definitions

For the purpose of the Contract (unless the context otherwise requires), the following expressions shall have the following meanings:

"Call-Off Order" or "COO"	a completed Call-Off Order duly signed by an authorised representative of RasGas, by which any requirement for Ad Hoc Services shall be ordered by RasGas
"Completion Date"	has the meaning given to it in the Form of Agreement
"Contract"	has the meaning given to it in the Form of Agreement
"Effective Date"	has the meaning given to it in the Form of Agreement
"Gross Negligence"	means, with respect to a Party hereto, any omission or action committed by the managerial or senior supervisory personnel of such Party, whether intentional or not, that constitutes a reckless disregard for harmful and foreseeable consequences.
"Site"	the location(s) specified in Section 3.0 (Scope of Services) or in any COO as being the place(s) where the Services shall be performed
"Services"	all Services performed pursuant to any COO under this Contract including but not limited to the Services set out in Section 3.0 (Scope of Services) and with respect to Contractor personnel means the Service and performance obligations of such personnel.
"Wilful Misconduct"	means, with respect to a Party hereto, an intentional act or omission committed by the managerial or senior supervisory personnel of such Party, where such Party contemplated such act or omission, and was aware that such act or omission by it would be likely to have harmful and foreseeable consequences.

Terms defined in the Form of Agreement shall have the same meaning when used in these General Conditions.

1.2 Headings

Title headings contained in the Contract are for convenience only and shall not be used in its interpretation.

1.3 References

- (a) Unless the context otherwise requires, references to Clauses, sub-Clauses and Sections are to the clauses and sub-clauses of and the sections of these General Conditions;
- (b) references to Contractor and to its personnel shall include Contractor's employees, agents and any subcontractor approved under Clause 22;
- (c) references to parties shall be to the parties hereto;
- (d) words importing the singular include the plural and vice versa;
- (e) words importing the masculine include the feminine or neuter and vice versa;
- (f) words importing persons include individuals, firms, corporations or partnerships and vice versa, as the context or reference to the parties requires;
- (g) any list or group of items following the words "including", "includes", "include", "such as" or "consisting of" and such like shall not be interpreted as being definitive and shall in all cases be completed by the expression "but not limited to".

**2. EXECUTION OF THE SERVICES****2.1 Conduct of Services**

The Contractor shall perform all Services continuously and expeditiously and shall complete the Services in accordance with all provisions of the Contract having due regard to any business critical targets or deadlines specified in the Contract or of which the Contractor has been made aware by RasGas.

2.2 Time of Essence

Time is of the essence in the completion of all Services.

2.3 Time Slippage

Where it appears any business critical targets or deadlines notified to the Contractor will not be met the Contractor shall notify RasGas as soon as possible. Such notification shall not relieve the Contractor of any of its obligations and the Contractor shall take all appropriate steps to achieve the agreed targets or deadlines including working such additional overtime, engaging such additional personnel and taking such other measures as may be necessary to complete the Services within the scheduled timetable or any approved extension thereto. All costs related to such overtime, additional personnel and other measures shall be borne by the Contractor.

2.4 Performance of the Services

The Contractor shall perform the Services in a professional manner at all times in accordance with the Contract using latest, industry-standard technology and sound project management and supervisory practices, and otherwise with all due diligence consistent with best practice in the consulting services industry.

2.5 Skill and Competence

The Contractor agrees that it has the required skills, know-how, experience and capacity to perform the Services using appropriately qualified and competent personnel who have been properly trained to carry out the Services including, where relevant, best available health and safety practice.

2.6 Commencement of Services

The Services shall commence on the Commencement Date and shall continue until the end of the Period of Maintenance (or any approved revision thereto) unless terminated earlier under Clause 16 (Termination) or any other applicable provision of the Contract.

2.7 Conformity with Scope and Specifications

The Services shall conform in all respects with Section 3.0 (Scope of Services) and any further specifications as may be agreed between RasGas and the Contractor and set out in the COO. The Contractor shall use high quality materials, techniques and standards in the supply of the Services and any products or materials supplied to RasGas by the Contractor shall be new and of the best quality and sound workmanship and design if applicable, and shall be fit for the purpose and use specified in, or reasonably to be inferred from, the COO.

2.8 Knowledge

The Contractor has carefully examined this Contract and has obtained a full understanding and knowledge of the nature, quality and scope of RasGas' requirements in respect of the Services and of its obligations under this Contract, including information as to the Site, local conditions and facilities and other relevant matters. The Contractor acknowledges that it is fully satisfied as to the correctness and completeness of all documents relating to this Contract and accepts all responsibility for having properly evaluated all costs and contingencies for successfully undertaking and completing the Services, and shall bear any and all consequences resulting from an improper or inadequate evaluation.

2.9 Property

The Contractor shall not use any item of RasGas property or equipment without the prior written authority of RasGas. Where RasGas gives its written approval, the Contractor shall ensure such property is treated with appropriate care, kept clean and maintained in good working order. The Contractor shall at all times be responsible for its own property at the Site (including tools and equipment).

**2.10 Inspections**

RasGas shall be entitled to have access, for the purposes both of inspecting and of observing tests and certificates, to any place where any Services (or part thereof) are being undertaken. Neither failure to inspect or instruct nor any approval given by RasGas shall relieve the Contractor of any of its obligations under the Contract.

2.11 Independent Contractor

The Contractor is an independent contractor and nothing in the Contract shall be construed as creating at any time any other relationship between the parties. The Contractor shall at all times have complete control over and full responsibility for its employees, agents and subcontractors. None of them shall be considered, or in any way represent themselves as being, employees of RasGas or be entitled to any benefits supplied by RasGas to its employees.

2.12 Compliance with laws and regulations

The Contractor shall at all times comply and ensure that its personnel comply with all applicable laws and regulations relevant to the provision of the Services.

3. Payment Terms and invoicing (Refer to Section 4.0 Compensation)**4. LIABILITY AND INDEMNIFICATION****4.1** Except as otherwise provided in the Contract, the Contractor agrees that it shall:

- (a) be liable to RasGas for all losses, costs, legal fees, damages and expenses whatsoever which RasGas may suffer, sustain, pay or incur ("**Losses**"); and
- (b) fully and effectively indemnify RasGas against any and all claims, liens, judgements, awards, remedies, debts, demands, penalties, liabilities, damages, injuries, costs, losses, expenses or causes of action or proceeding of whatever nature including without limitation punitive damages or exemplary damages and all fees associated with any such action or proceeding, and those claims made or enjoyed by administrators (or other insolvency officers), successors, survivors or assigns ("**Claims**") which may be brought against or suffered by RasGas or which it may sustain, pay or incur;

as a result of or in connection with the performance, purported performance or non-performance of the Contract by the Contractor, and whether the same results from or in connection with the use by the Contractor of any machinery, tools or equipment belonging to RasGas or from or in connection with the negligence or wilful acts or omissions of RasGas or its agents, employees or other contractors while acting under the direction or control of the Contractor; but excluding any Losses or Claims to the extent that they are suffered, sustained, paid or incurred by reason of the negligence or wilful acts or omissions of RasGas or its agents, employees or other contractors while not acting under the direction or control of the Contractor.

4.2 Consequential Damages

Neither RasGas nor the Contractor shall bear any liability to the other for loss of profits, loss of business, loss of contracts or other indirect or consequential loss, except if a Party has committed an act or omission of Gross Negligence or Wilful Misconduct attributable to its managerial or senior supervisory personnel and in no event will a Party be required to release or indemnify the other party for Gross Negligence or Wilful Misconduct attributable to the other Party's managerial or senior supervisory personnel.

5.0 INSURANCE**5.1** The Contractor shall ensure that its respective insurers waive all rights of subrogation against the Company, its parents, its subsidiaries and all other indemnities of the Contractor hereunder. For this purpose, the Contractor shall also cause the Company and all other indemnities of the Company to be included as additional insured and covered by the insurance policies described herein.**5.2** The Contractor shall ensure that to the extent of indemnities given by the Contractor hereunder, the Contractor's insurance shall be primary, receiving no contribution from any other insurance



arranged by or on behalf of, or available to, the Company. To give effect to the provisions of this Contract the Contractor shall also cause to be waived any clause in the insurance policies that reduces coverage to the extent of coverage by other insurances, if any.

- 5.3 All deductibles within and/or liabilities in excess of the indemnities provided under the insurances to be arranged by Contractor shall be for the account of and paid by Contractor, as applicable. The insurance limits mentioned herein are minimum requirements and not limits of Contractor's liability, and they are not to be construed as the Company's consent to limiting the Contractor's financial liability. Approval by Company of any insurer or terms of insurance proposed by Contractor shall not relieve the Contractor from any of his obligations or liabilities under or arising from this Agreement or generally at law.

- 5.4 The insurances to be arranged by the Contractor shall be the following:

- a) **Workmen's Compensation & Employer's Liability** (Not applicable)
- b) **General Third Party Liability Insurance** (Not applicable)
- c) **Marine Vessels Insurance**

Contractor shall carry, or shall ensure that the marine vessels being employed for the performance of the Services carry, all insurance coverage's as required by law(s) and by the Ras Laffan Port regulations. The required insurances shall include, but not be limited to, the following:

1. Marine Hull Insurance covering Hull and Machinery of the marine vessel including plant and equipment there on full terms and conditions of cover that the insurance market offers, covering the full replacement value of the vessel and the equipment as described above. This insurance should be extended to cover Removal of Wreck and Debris in respect of the vessel, for a minimum of Hull Value but, in any case, not less than US\$25,000,000 per occurrence.
2. Protection & Indemnity (P&I) risks coverage for the vessel including seepage and pollution risks for the standard limits provided by the P&I clubs' market. It should however be not less than US\$50,000,000 per occurrence. The coverage should include Third Party Liability risks and contractual liability risks connected with the performance of the Services under this Agreement.

The Contractor shall ensure adequacy of all insurances specified herein at all times and shall furnish to Ras Gas, prior to commencement of this Contract, certificates from their insurers or insurance brokers or P&I clubs attesting that appropriate insurance policies have been effected. The Contractor shall make no material alterations to the terms of any insurance without information being given to Ras Gas and in any case shall immediately notify Ras Gas should their insurer make any material alterations thereto.

6. TITLE

6.1 Good Title

The Contractor shall, at all times, have good title free and clear of any encumbrances to all products, equipment or materials to be supplied to RasGas in the performance of the Services.

6.2 Passing of title and risk

Title to any products, equipment or materials shall pass to Contractor at the time of loading of the inlet flange to the vessel.

7. CONFIDENTIALITY

Confidential Information means all proprietary information which comes into the possession of the Contractor or any of its personnel concerning the technical, financial or business affairs of RasGas including, but not limited to, information relating to its trade secrets, products, processes and business relationships except to the extent that same shall have been published or



otherwise made freely available to the public without restriction. In addition, information concerning or relating to this Contract (including information developed by the Contractor in the performance of the Services) shall be presumed to be confidential.

The Contractor shall not, without RasGas' consent, disclose any Confidential Information to any third party nor use it other than on RasGas' behalf in the performance of the Works and then only to the extent necessary. The Contractor further agrees to take all reasonable and prudent steps to safeguard the Confidential Information including making only such copies, as shall be necessary and restricting access to such documents on a "need to know" basis only.

8. SUSPENSION OF SERVICES (Not applicable)

9. CANCELLATION

9.1 Notice to cancel

RasGas shall have the right at any time to cancel the Services, upon Six (6) months written notice to the Contractor.

9.2 Amount payable on cancellation

RasGas shall as soon as practicable after any such cancellation, determine (after reference to the Contractor and after such investigation or inquiries as it may think fit) the amount owing and due to the Contractor in respect of Works actually provided up to the date of cancellation in accordance with GAAP. Once determined, RasGas shall notify the Contractor of the relevant amount and the Contractor shall submit an invoice in respect of such amount in accordance with Clause 4 (Payment Terms). For the avoidance of doubt, notice of cancellation hereunder shall not constitute a breach nor entitle the Contractor to any damages, compensation for loss of anticipated profits or Claims.

10. TERMINATION

10.1 Definition of default

The Contractor shall be considered in default regardless of the status of the Contract or performance under it, upon the happening of any one of the following events ("Event of Default").

- (a) if the Contractor commits a material breach of any of its representations, warranties or other obligations hereunder;
- (b) if the Contractor breaches any of its obligations under the Contract or under any COO which, in either case, if RasGas considers is capable of remedy, is not remedied within 60 days of the date of written notice from RasGas requesting such remedy; or
- (c) if the Contractor becomes bankrupt or insolvent or commits or suffers any act of bankruptcy or insolvency (other than voluntary liquidation for the purposes of a bona fide amalgamation or reconstruction) or makes any assignment for the benefit of creditors or has a liquidator, administrator, receiver or similar officer appointed over its assets or causes or permits any judgement to be enforceable against it in respect of non-payment of debts.

10.2 Termination

If an Event of Default occurs then RasGas may terminate the Contract with immediate effect without thereby releasing the Contractor from any of its obligations or liabilities under the Contract and without prejudice to RasGas's other rights and remedies hereunder and at law.

10.3 Payment on termination for default

Where the Contract is terminated, RasGas shall not be liable to pay to the Contractor any amount in respect of the Contract until the Services then in progress have been completed to its satisfaction and only when the costs of execution, completion, damages/penalties for delay in completion (if any) and all other expenses incurred by RasGas, including the costs of any third party RasGas may use to complete the Services, have been ascertained and deducted accordingly.

**11. FORCE MAJEURE****11.1 Definition**

Force Majeure shall mean an event which is neither foreseeable nor preventable and which is entirely outside the direct or indirect control or influence of the Contractor or RasGas including any one or more of the following events:

- (a) acts of God including without limitation lightning, flood or unusual or extreme weather;
- (b) wars, revolutions, riots, blockades and other unlawful acts against public order;
- (c) strikes, lockouts, labour disturbances;
- (d) any other event (excluding financial distress), which is neither foreseeable nor preventable by the party claiming Force Majeure.

11.2 Operation

Neither RasGas nor the Contractor shall be liable for the performance of its obligations to the extent such performance is prevented by an event of Force Majeure. The party claiming an event of Force Majeure shall promptly notify the other party of such event and any impacted performance under the Contract shall be suspended.

11.3 Effect

As regards any delay or failure to perform as a result of Force Majeure:

- (a) the party claiming the Force Majeure will take all reasonable steps to bring the circumstances to a close or to find a solution whereby the Contract may be diligently performed despite the event of Force Majeure; and
- (b) promptly take such other steps, which the other party reasonably requires in order to reduce the other party's losses or risk of loss.

11.4 Termination for Force Majeure

If an event of Force Majeure continues for a period of 120 days or more, the party not claiming Force Majeure shall be entitled to terminate the Contract at any time on giving written notice, such notice to take immediate effect and the relevant provisions of Clause 10 (Termination) shall apply.

12. ENVIRONMENT, HEALTH AND SAFETY ("EHS")

Refer Section 7.0 - EHS Requirements.

13. ALCOHOL AND DRUG POLICY

The Contractor shall be bound by the Company's alcohol and drug policy including, but not limited to, the following excerpt:

The use, possession, distribution or sale of illegal drugs, alcohol or controlled substances and the paraphernalia associated with such on Company's premises including working areas is absolutely prohibited. If a visitor [including Contractor] is in violation of this policy he will be immediately escorted off the premises and reported to the local law enforcement authorities, if appropriate.

Entry onto Company's property is deemed consent to an inspection of person, vehicle and personal effects at any time while on Company's premises. Inspections will be conducted at the discretion of the Company.

14. ASSIGNMENTS AND SUBCONTRACTS**14.1 Assignment by RasGas**

RasGas may assign the Contract or any interest therein to any affiliate or shareholder or to any of its lenders as required under the terms of any of its loan agreements.

14.2 Assignment by the Contractor

The Contractor shall not assign the Contract or any part thereof without the prior written consent of RasGas. Such consent shall not release or relieve the Contractor from any of its obligations or liabilities under the Contract. Contractor may assign any or all of the proceeds due and payable under this contract to any bank or other lending institution with notification to Ras Gas but without further consent of Ras Gas.

**14.3 Subcontracting by the Contractor**

The Contractor shall not subcontract all or any part of the Services or any part of the Contract without prior written approval by RasGas. Notwithstanding approval by RasGas to subcontract all or any part of the Services, the Contractor shall remain primarily liable to RasGas for performance of the Contract and primarily liable to RasGas for any default or failure to comply with the terms of the Contract by any subcontractor. The Contractor shall promptly furnish such information about its subcontractors as RasGas may request and, for this purpose, the Contractor shall ensure that disclosure to RasGas is not excluded under the terms of any of its subcontracts. In addition, where the Contractor subcontracts hereunder with any non-Qatari subcontractor, the Contractor shall promptly furnish the required contract details to the Qatar Office of Income Tax. No subcontract shall bind or purport to bind RasGas but every sub-contract shall contain the subcontractor's consent to RasGas taking assignment from Contractor of the sub-contract.

15. PREFERENCE FOR LOCAL SERVICES

For all Services provided by the Contractor in Qatar, the Contractor shall:

- (a) in selecting personnel/subcontractors (including those relating to transportation and/or shipping), select individuals who are nationals of Qatar or companies that are controlled by individuals who are nationals of Qatar, provided that;
 - (i) the Contractor is reasonably satisfied (on the basis of demonstrated ability, quality, timely performance, workmanship or other relevant criteria) with the ability of such person to perform the relevant Services;
 - (ii) the cost does not exceed one hundred ten percent (110%) of the cost of equivalent or similar services offered by, or otherwise available from, non-Qatari nationals or companies that are controlled by non-Qatari nationals; and
 - (iii) the other terms and conditions applicable are otherwise competitive with those available from non-Qatari nationals or companies that are controlled by non-Qatari nationals;

16. PERFORMANCE BOND**16.1 Form**

The Contractor shall, at its own expense, procure and deliver to RasGas by the date specified in the RasGas letter of acceptance, but in no event later than 10 days after the Effective Date, a performance bond issued by a bank registered and operating in Qatar in the form set out in Section 8.0 (Bonds/Guarantees) in the amount of **US \$ 84,806 (Eighty Four Thousand Eight Hundred and Six Only)**. Where the sums payable to the Contractor hereunder increase as a result of any Change Order, the Contractor shall increase the amount secured by the performance bond by the equivalent percentage increase. For the avoidance of doubt, RasGas' obligation to pay the Contractor shall be suspended at any time the performance bond is not fully compliant herewith.

16.2 Demand

RasGas shall be entitled to make demand under the performance bond in accordance with its terms without giving any reasons therefore to the Contractor and the fact that a dispute exists, or Clause 20 has been invoked, shall not prevent RasGas from making a demand.

16.3 Duration

The Performance Bond shall remain valid and enforceable until final completion of all Works

17. NOTICES

Notices shall be in writing and shall be deemed received only when actually delivered by hand, mail, courier or sent by fax, on the day receipt is acknowledged by the receiving party as addressed to the relevant address in the Form of Agreement.

18. PUBLICITY

The Contractor shall neither use nor consent to the use of RasGas' name, logo or trade mark in connection with the Contract in any advertising, marketing or other promotional material or publicity releases or for any similar purpose without the prior written consent of RasGas.

**19. GENERAL PROVISIONS****19.1 Amendments**

This Agreement may not be amended, in whole or in part, except by a written instrument signed by the duly authorized representatives of both parties.

19.2 Waiver

No waiver of any provision of this Contract shall be of any force or effect unless such waiver is in writing, is expressly stated to be a waiver of a specified provision of this Contract and is signed by the party to be bound thereby.

19.3 Language

The language of the Contract shall be English and all communications between the parties (verbal or written) relating to it, shall be conducted in the English language.

19.4 Severability

The invalidity of unenforceability of any provision of the Contract shall in no way affect the validity or enforceability of any other part or provision. Any invalid or unenforceable provision shall be severed from the Contract and the balance of the Contract shall be construed as it was intended and enforced as if the Contract did not contain such invalid or unenforceable provision.

20. GOVERNING LAW & SETTLEMENT OF DISPUTES**20.1 Applicable Law:**

The laws of the State of Qatar shall apply to this Contract and to the rights and obligations of the parties.

The parties shall endeavour by consultation and negotiation amicably to resolve in good faith any dispute arising out of or in connection with the validity, performance, interpretation or termination of this Contract, and any and all consequences thereof. Each such dispute shall be duly notified by the claiming party to the other party.

Lacking amicable resolution, the parties shall submit to final and binding arbitration at a forum to be agreed, and lacking agreement on an arbitration forum, either party shall have the right to refer the conflict or dispute to a competent court in the State of Qatar.

20.2 Settlement of Disputes:

- a) All disputes which, in the opinion of one of the parties as stated an arbitration notice, the parties are unable to resolve by mutual agreement (in good faith and using their reasonable efforts and endeavours to take all steps as may be necessary or desirable to settle any dispute amicably through negotiations and other constructive discussions) shall be exclusively and finally settled by arbitration in accordance with the Rules of Arbitration of the International Chamber of Commerce as in force on the effective date of the Agreement except as modified by provisions of this article (Settlement of Disputes).
- b) Ras Gas and Contractor shall endeavour to agree on the appointment of a sole arbitrator to agree on the appointment of a sole arbitrator, but, if they fail to so within thirty (30) days of arbitration notice, each of them shall appoint a third arbitrator. If either or both of parties fail to appoint an arbitrator within forty-two (42) days of arbitration notice, such arbitrator or arbitrators shall, at the request of any party, be appointed by the Appointing Authority. If the two arbitrators are appointed but fail to agree on the choice of a third arbitrator within fourteen (14) days of their appointment, the third arbitrator shall be appointed by the Appointing Authority at the request of either Contractor or Ras Gas.
- c) The place of arbitration shall be London, England, unless the parties agree otherwise.
- d) The arbitration shall be conducted in English, and all arbitrators shall be fluent in English language.



- e) The arbitration tribunal shall decide all questions strictly in accordance with the terms of this Agreement and shall give effect to same. The arbitrators shall not be authorised to award special, indirect, incidental, consequential, punitive or exemplary damages.
- f) The parties agree that the arbitrators' award shall be binding upon the parties, and that the parties shall give effect to any such award. The parties agree to exclude any appeal right to any court, which would otherwise have jurisdiction in the dispute or out of the award. Either party may, however, make an application to any court have jurisdiction for registration of the award for the arbitral award to be recognized and enforced, including enforcement of any award granting interlocutory relief, against either party and for the obtaining any evidence (whether by discovery of documents, interrogatories, affidavits, or testimony or witnesses, whatever), which the arbitrators direct shall be admitted in the arbitral proceedings.
- g) Notwithstanding the other provisions of this article (Settlement of Disputes), any dispute may be referred to settlement by an alternative dispute resolution mechanism or the expert, if the parties to the dispute agree that such alternatives are more appropriate to the circumstances of that dispute.

21. BUSINESS STANDARDS

- a) Contractor in performing its obligations under this Contract shall establish and maintain appropriate business standards, procedures and controls. In performing their respective obligations and undertakings under this contract, the Parties shall use all reasonable endeavors to prevent their employees or personnel or contractors from making, receiving, providing or offering any substantial gifts, extravagant entertainment, payments, loans or other considerations to or from the other Party's employees, personnel or contractors.
- b) Contractor and Company are aware of a practice (referred to as "Illegal Information Brokering") where certain parties approach contractors, subcontractors or vendors, and offer confidential information or illicit influence in order to obtain business through corruption of competitive bidding processes. Contractor represents that it has not and will not utilize or participate in Illegal Information Brokering in connection with this Contract.

THIS INDICATES THE END OF THESE TERMS AND CONDITIONS



SECTION 3.0

SCOPE OF SERVICES

FOR

SULFIDIC CAUSTIC SOLUTION
RECEIVING AND HANDLING SERVICES
AND
REMOVAL AND TRANSPORTATION SERVICES

UG



INTRODUCTION

RasGas Company Limited:

The LNG Plant Facilities of the RasGas Company Limited (RasGas), hereinafter referred to as Company, is located in Ras Laffan Industrial City – towards the North end of the State of Qatar peninsula.

The Facilities produce liquefied gas for storage and export. Currently there are five (5) trains in operation with capacity to produce around 21 MTA of LNG per annum as well as 140,000 barrels of condensate per day. The Company is in an expansion mode with the additions of two (2) new Trains and the capacity to produce LNG is projected to be around 35 MTA.

The Onshore Terminal comprises gas and condensate receiving facilities, gas treatment, condensate stabilization, gas liquefaction, sulfur recovery, condensate storage and LNG storage areas – together with port loading jetties, related utility plant and offsite building(s) housing all associated equipment and personnel - providing external and interrelated services.

Scope Overview:

This Contract is to provide the Company services to receive, and handle the sulfidic caustic solutions produced at RasGas's LNG plant located in the state of Qatar, and delivered at the Contractor's discharge port.

The removal and transportation of sulfidic caustic solution, by the Contractor, must be managed in an environmentally responsible manner, and must be performed at regular intervals as required by the Company. The Company and Contractor appointed independent Surveyor(s) shall oversee the services in load port and in discharge port.

DETAILED SCOPE OF SERVICES

Principal services to be performed by the Contractor are to receive, remove, transport, and handle the sulfidic caustic solutions produced at Ras Laffan's LNG plant located in Qatar, pursuant to the following:

1. COMMODITY AND SPECIFICATIONS

- 1.1 Sulfidic caustic solutions, which are subject to this Contract, shall be those solutions obtained as a result of contacting virgin caustic with light hydrocarbons ("Sulfidic Caustic"). The solutions shall contain any amount of sodium content. The solution shall contain a maximum of 5% by weight sulfide content as S^{2-} . The solutions shall not contain more than 5% by volume acid oils and hydrocarbons. RasGas shall ensure that the Sulfidic Caustic solutions will not include free oil, or any extraneous materials not directly associated with RasGas's process described above.
- 1.2 Contractor shall accept all shipments with any amount of Sodium content, with a sulfide maximum content of 5% by weight as S^{2-} , and that have no more than 5% by volume acid oils and hydrocarbons. The Sulfidic Caustic solutions will not include free oil, or any extraneous materials not directly associated with RasGas' process described above.

**2. CONTRACTOR WARRANTIES**

Contractor represents and warrants that it:

- (a) has the competence to receive, remove, transport, and handle the Sulfidic Caustic delivered hereunder (the "Services");
- (b) has or shall obtain the necessary tools, equipment and personnel to perform the Services outlined hereunder;
- (c) shall maintain and use all tools and equipment in accordance with manufacturer's specifications and recommendations and good engineering and operational practices;
- (d) has or shall obtain, at its expense, before performing hereunder all the necessary certificates, permits, licenses and authorizations to conduct business and perform the Services required outside of Qatar;
- (e) shall perform all Services in accordance with all applicable law;
- (f) shall perform all Services in good faith, promptly, with due diligence and competence; and,
- (g) fully comprehends the requirements and contingencies for providing the Services outlined herein.

3. TANKER SCHEDULING

The tanker scheduling provisions for the Sulfidic Caustic solutions delivered and received hereunder are specified in Schedule I, which is incorporated herein.

4. DURATION OF THE SERVICES

The proposed duration of the Services shall be for the period of 3 months, covering the receipt, removal, transportation, and handling of one (1) cargo on or around 07-11 December 2008 from Ras Laffan, Qatar, from the effective date of 1 December 2008, with an option to extend for a further period of three (3) months, to cover the lifting of one (1) additional cargo.

5. ESTIMATE OF ANTICIPATED QUANTITIES

RasGas best estimates of quantities during the Contract period are as follows:

<u>Loading date range (Ras Laffan)</u>	<u>QUANTITIES (metric tons)</u>
07-08 December 2008	1 cargo: up to 1,500 +/- 10%

Depending on the operation conditions and RasGas experience, the anticipated take off quantity may be up to 1,500 +/- 10% metric tons per trip. The foregoing estimates are included to assist in resourcing the Services but RasGas does not guarantee the quantity, nor the timing of cargoes throughout the Contract period. All risk in resourcing levels to meet the performance requirements of the Services remains with the Contractor.



During the term of this Contract, RasGas may elect to deliver to Contractor additional quantities of Sulfidic Caustic on the terms and conditions outlined herein.

Attachments:

- Schedule I - Transportation related procedures
- Attachment A - Tanker Nomination Questionnaire

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**SCHEDULE NO. I****1.1 TRANSPORTATION****1.1.1 Delivery**

Terms of this Contract shall be “Free on Board” (FOB) Ras Laffan, Qatar, as per “Incoterms”. Contractor agrees to receive at the loading flange of the tanker’s manifold the Sulfidic Caustic solution in accordance with the terms and conditions of this Contract.

1.1.2 Title and Risk of Loss

Delivery shall be deemed completed, and title to, risk of loss of and all liability for the Sulfidic Caustic solution shall pass to Contractor at the receiving flange at the load port’s manifold. Any loss, damage, deterioration, or evaporation to or of the Sulfidic Caustic solution after delivery shall be for the account of Contractor, who shall bear the cost of all such loss, damage, deterioration, or evaporation.

1.1.3 Independent Surveyor

RasGas shall appoint an independent surveyor acceptable to Contractor, and such acceptance not to be unreasonably withheld. Contractor and RasGas shall share the costs incurred by the independent surveyor at the load port.

1.1.4 Sampling

Before loading, a suitable method shall be used to ensure a representative sample is drawn into a twenty (20) liter container from the shore’s tank at the loading terminal. The independent surveyor shall arrange for five (5) identical and representative samples to be taken from the suitable container and distributed as per the following table. The parties shall retain the samples for at least ninety (90) days.

Company	No. of Samples	Sample Size
Contractor	2	1 Liter
RasGas	1	1 Liter
Ship	1	1 Liter
Independent Surveyor	1	1 Liter

1.1.5 Analysis

The sample delivered to the parties shall be promptly analyzed by RasGas/Contractor, so that the specification of the product at the time of custody transfer between RasGas and Contractor can be verified.

1.1.6 Measurement

The quantity of the material delivered by RasGas to its Contractor shall be determined by volume measurement of the ship’s tanks using the ship’s certified ullage, trim, and list tables, and shall be verified by the independent



surveyor and RasGas/Contractor. The independent surveyor's determination of quantity and quality shall, in the absence of fraud or manifest error, be final and binding and shall be used for invoicing purposes.

1.1.7 Resolution and Discrepancies

Contractor and RasGas agree that if either takes any exception to any of the delivery survey reports with respect to the quantity or quality of the material delivered, they will promptly notify the other party by facsimile, giving complete details of the matter(s) to which they take exception, and work together amicably to resolve the reported discrepancy and cause thereof on a timely basis.

1.1.8 Lifting

Contractor shall provide a vessel that meets the following criteria:

- The vessel must be compatible with Company's berth facilities.
- The vessel must be approved by Company or its designee.
- The vessel has to be acceptable to Company's load port. Contractor shall ensure that its transporter's vessel complies with all applicable port and terminal regulations governing operations within Company's load port.

Contractor is to provide or arrange for tankers/vessels that have been maintained in good working order all equipment necessary to complete the transfer of the material, and the tanker shall provide, as needed, valid certification with regard to registry, classification, and insurance, and other documentation according to International Maritime Organization (IMO) law.

1.2 NOTICES

1.2.1 Ninety (90) Days' Notice [if applicable]

RasGas shall give Contractor ninety (90) days' notice of the required delivery date.

1.2.2 Thirty (30) Days' Notice [if applicable]

RasGas shall give Contractor thirty (30) days' notice, with a five (5) days' date range for the nominated tanker/vessel. Within two (2) working days of receipt of such notice, Contractor shall confirm the date range is acceptable.

Contractor shall send to RasGas the following information, at least twenty-one (21) days prior to the first day of the accepted date range:

- The five (5) days' date range to be reduced to two (2) days.
- If applicable, the completed Tanker Questionnaire, attached hereto as **Attachment A**.
- If applicable, previous cargo referencing the relevant pages of the IBC Code Book dated 1998. (Applicable tanks only.)
- If applicable, cleaning agent last used in applicable tanks, if cleaned since the last cargo.



- If applicable, details of other cargo parcels aboard the tanker/vessel while she is alongside at Ras Laffan Port, referencing the relevant pages of the IBC Code Book dated 1998.
- Demurrage Rate on the understanding that allowable laytime shall be twelve (12) hours from the time that Notice of Readiness (NOR) is given and accepted, until the tanker/vessel has her unloading arms disconnected.
- Contractor may provide a substitute tanker if all provisions of this Agreement are met.

1.2.3 Rolling 6-week Lookahead Notice [if applicable]

RasGas shall give Contractor this notice of the required delivery date on a weekly basis.

1.2.4 Laytime and Demurrage

The vessel owner / Contractor to provide RasGas with notice of the ETA and anticipated NOR to berth at the loading terminal fifteen (15), three (3), two (2), and one (1) days' notice in advance of arrival.

Vessel shall give notice to RasGas that the tanker is ready to load upon arrival at the customary anchorage of the loading terminal. If the tanker arrives during the accepted date range, RasGas shall provide berth to the tanker as soon as possible, and laytime shall commence six (6) hours after the NOR has been given and accepted, or after the connection of cargo loading hoses, whichever occurs first. Laytime shall continue until the cargo hoses at the loading terminal have been disconnected.

Total allowed laytime for the loading of the vessel shall be twelve (12) hours. In the case of delays, except where loading is delayed by reason of force majeure, reasons beyond the control of RasGas, such as, but not limited to, prevention or hindrance due to adverse weather, Contractor, or the tanker, RasGas shall pay demurrage in US Dollars to Contractor at the applicable rate.

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QATARGAS \ RASGAS
TANKER NOMINATION QUESTIONNAIRE
(NFC2/RGFC - QRC/RGPC)

A1	Tanker name :	A2	IMO Number :
A3	Previous name :	A4	Flag :
A5	Owner / Operator :		
B1	Vessel Type: Product <input type="checkbox"/> Crude <input type="checkbox"/> Chemical <input type="checkbox"/> Combination Carrier (OBO) <input type="checkbox"/>		
B2	Classification Society :		
B3	Date Tanker Last Inspected under Buyer Vetting system :		
B4	P & I Club name :	B5	P & I Valid Until :
B6	DOC Valid until :	B7	SMC Valid until :
B8	Year Built :	B9	Summer DWT : M.Tons.
B10	NRT :	B11	Arrival Displacement : M.Tons.
C1	LOA : m.	C2	Beam : m.
C3	Moulded Depth : m.	C4	Manifold Height above Keel : m.
C5	Arrival Drafts – Fwd : m.	Aft : m.	
C6	Departure Drafts – Fwd : m.	Aft : m.	
C7	Distance - FWD to centre of manifold(LOA Reference) : m.		
C8	Parallel Body Length (Ballast Cond.) – Fwd to Manifold: m		Manifold to Aft: m.
D1	Horizontal Distance from Reducer flange to edge of Drip Tray : m.		
D2	Is the vessel fitted with manifold as per OCIMF guidelines		Yes <input type="checkbox"/> No <input type="checkbox"/>
D3	For NFC2 \ RGFC 2 x 16" manifolds max spacing 4.0 m		Yes <input type="checkbox"/> No <input type="checkbox"/>
D4	For QRC \ RGPC 1 x 12" manifold		Yes <input type="checkbox"/> No <input type="checkbox"/>
E1	Segregated Ballast to Discharge		Yes <input type="checkbox"/> No <input type="checkbox"/>
E2	Products carried on immediate prior voyage in nominated tank :		
F1	Is the vessel Fitted with fully operational Inert Gas system		Yes <input type="checkbox"/> No <input type="checkbox"/>
F2	Is vessel capable of closed loading		Yes <input type="checkbox"/> No <input type="checkbox"/>
F3	Does vessel have common venting system		Yes <input type="checkbox"/> No <input type="checkbox"/>
F4	If the answer to F3 is No, advise venting capacity for individual tank :		m³/hour
F5	Maximum Load Rate capacity :		m³/hour
G1	Is the vessel capable of Mooring 3 x 3 x 2 each end without mixed moorings? Yes <input type="checkbox"/>		No <input type="checkbox"/>
G2	If the answer to G1 is "No" ; What mooring Arrangement can the vessel present?		

Provided By: _____

Date: _____

Doc. No. :	QG/RG/RLIC/01/2002/001	Issued By:	For Qatargas	M.G.Rowland
Date of Issue :	15-Jan-2002		For RasGas	J.E.Carr
Revision No. :	1		For RLIC Port	G.B.King



SECTION 4.0

COMPENSATION

[Handwritten signature]



1.0 PRICING STRUCTURE

- 1.1 Compensation listed in the Schedule of Prices herein constitutes full payment of the Contract Sum for all services covered in this Contract and includes, but is not limited to, the furnishing of all technical and professional services, equipment, material, supplies and all operations and items necessary to complete the services described in the Scope of Services of this Contract.
- 1.2 The Contract Sum shall be derived from the Unit Price/Gallon for the Receiving and Handling Services and lump sum for Removal and Transportation performed by the Contractor in accordance with Section 3.0 Scope of Services .

2.0 PRICING CONDITIONS

2.1 Currency of the Contract

- 2.1.1 The currency of the Contract shall be the United States Dollar (US\$) and all compensation and invoices shall be expressed and all payments shall be made in that currency.
- 2.1.2 Should any expenses, subject to reimbursement by the Company at cost, be incurred and paid by the Contractor in a currency other than the United States Dollar, then such expenses shall be expressed in United States Dollars. Conversion shall be made at the selling rate of such currency as published by the Qatar National Bank on the 25th day of the month, or the last banking day before the 25th day of the month in which the expenses in question were incurred, and the rate used shall be identified in the relevant invoice and the accompanying supporting information.

2.2 Unit Prices Fully Inclusive

Without limitation the Unit Price/Gallon and lump sum price in this Compensation section shall be fully inclusive of but not limited to

- Manpower, necessary tools and equipment and personnel to perform the services
- Required external safety training,
- Standard personal protective equipment (PPE)
- Overheads, on costs and profit.
- Payroll and payroll burden, salary, allowances, bonus, insurance and pension religious or public holidays work, medical and sickness schemes, specialist equipment, safety equipment & protective clothing, accommodation and subsistence, commuter travel or Company vehicle provisions.
- Obtaining and maintaining all permits, visas etc.
- All costs associated with leave or leave cycles, hand-over / overlap etc.
- All applicable taxes and disbursements.
- Currency conversion and funding.
- Insurance's.
- Agency or sponsorship fees including local office costs.
- All costs associated with the execution and satisfactory completion of the Contract and all costs associated with compliance with the Contract obligations in accordance with Section 3.0 Scope of Services.

**2.3 Validity of the Unit Price/Gallon**

2.3.1 The Unit Prices/Shipment in this Compensation section shall remain fixed and firm for the removal / transportation / receipt / handling of one (1) cargo, effective the planned date of Commencement of the Services.

2.4 Basis of Compensation

2.4.1 Compensation shall be on the basis of gross Gallons inclusive of all services required for that cargo.

2.4.2 No payment will be made for services provided to remedy defects or to remedy any default of the Contractor.

3.0 SCHEDULE OF PRICES

3.1 The fully-inclusive Unit Price for the performance of Scope A – Receiving and Handling Services is as follows: -

	Description	Unit Price (US\$ per US Gallon)
1.	Sulfidic Caustic Solution Received	
	1.1 sodium content above 3%	0.59
	1.2 sodium content less than 3% but more than 1%	0.64
	1.3 sodium content less than 1%	0.67
	1.4 Average price for either of the three grades above	0.633

3.2 The fully-inclusive Lump Sum Price for the performance of Scope B – Removal and Transportation services is as follows: -

	Description	Lump Sum Price (US\$ per US Gallon)
1.	Sulfidic Caustic Solution Transported from Ras Laffan, Qatar to:	350,000
	1.1 Houston, United States of America	(Three Hundred and Fifty Thousand Only)
	1.2 1.37 Gallon Based on shipping costs of \$350K for 1,000mt cargo	

4.0 INVOICING

All invoices shall be submitted to RasGas, P.O. Box 24200, Doha-Qatar, for the attention of the Accounting Manager, Finance Department, showing Contract reference number and Contract Title.

Invoicing for Sulfidic Caustic Solution shall be based on the gross gallons as per Section 3.0 Scope of Services, Schedule No. 1 Article 1.1.6 – Measurement. Copies of the analyses showing the concentration of sodium and sulfide sulfur shall be attached to each invoice.



Payment of approved invoices shall be made within Forty-Five (45) day's from the date of invoice received by RasGas with supporting documentation. All invoices shall be submitted to RasGas, P.O. Box 24200, Doha-Qatar, for the attention of the Accounting Manager, Finance Group, showing Contract reference number and Contract Title.

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SECTION 5.0
PRELIMINARIES
AND
CO-ORDINATION PROCEDURES

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PART 1 – PRELIMINARIES

1. DEFINITION

For the purposes of this Section 5.0, and where the context so requires, the term “Work” shall have the same meaning as “Works” or “Services” as the case may be under the definitions in Section 2.0 (General Conditions). If there is any conflict between the requirements of this Section 5.0 and Section 3.0 Scope of Work, then Section 3.0 Scope of Work will take precedence.

2. ONSHORE STANDARD WORKING SCHEDULE HOURS

The Contractors duration of the Works/Services will be as defined in the Scope of Work / Compensation sections.

The Contractors Standard Onshore Working Hours at the Ras Laffan Industrial City, RasGas Site will be:

Sunday through to Thursday (5) five days a week 7.00am to 4.00pm any deviation to these working hours, will be defined in the Scope of Work. The above hours will include for (8) eight actual working hours, (1) one hour meal break, and the exclusion of any travelling time to and from the site.

During the Holy Month of Ramadan the requirements of the Scope of Work for the Contractors personnel shall be maintained as scheduled and statutory remuneration for working above the working hours fixed by the Ministry of Civil Services shall be to Contractors Account.

Contractor shall observe official, public holidays and/or official (non working) condolence days, only on the specific dates declared for the private sector by formal decree issued from the Ministry of Labour and Social Affairs.

Statutory remuneration for Contractor's employees who do not work on official public holidays or official condolence days shall be for the Contractor's account.

3. OFFSHORE REQUIREMENTS

3.1 Mobilisation/Demobilisation:

The Contractor must provide personal details (including next of kin) to Company in advance of their employees travelling to an offshore location. For this purpose the Contractor will be required to complete a Movement and Personnel System (MAPS) form, for each employee and submit the form by fax (whenever possible a minimum of 7 days in advance of the day of travel) to the heliport. Please note: two passport size photographs will be required for each individual attending the heliport and travelling to a RasGas offshore facility for the first time.

The Contractor's personnel will report to Gulf Helicopter Departure/Arrival located in Gulf helicopter's Terminal, Doha at the allocated time for mobilization to Company Offshore facilities. The Contractors personnel will follow instructions of the ground crew and flight crew at all times and abide by all safety briefings and security instructions.

On arrival at the offshore destination The Contractors personnel will follow instructions of Company Representatives with reference to safety briefings and allocation of rooms and on the life boat assignment in living quarters platform.



Upon the completion of the work, The Contractors personnel will be assigned a seat on the first available flight to Doha. Prior to departure Contractors personnel will be obliged to follow all RasGas safety procedures and security, attend safety briefings and security checks. On arrival at Doha, Contractors personnel will follow instructions of flight, crew airport personnel until clear of the Terminal Building.

3.2 Hours of Work:

Contractors personnel will work a twelve (12) hour day shift or night shift inclusive of meal breaks. Weekend (Thursdays & Fridays) and Public Holidays are considered normal days offshore. Overtime is defined as additional hours to the normal 12 hour day and will only be worked at the request of the Company's Supervision.

During the Holy Month of Ramadan the Contractors personnel will be allowed to work hours in accordance with Company guidelines.

4. STAFF/LABOUR QUALIFICATIONS

- 4.1 The Contractor is responsible for the provision of valid residence permit, driving license, admission badges, and other mandatory authorisations of government, local bodies or company that may from time to time be required.

5. MATERIALS

- 5.1 Contractor shall comply with the Procedures and Requirement of the RasGas Material Store, Salvage or Scrap Yard and Recycling Facility or any other store, salvage or scrap yard specifically installed for the purpose of this Contract. All of these are, or will be, situated within the boundaries of the Ras Laffan LNG Plant complex.

6. INSULATION

The Contractor shall when required by Section 3.0 – Scope of Work arrange for any necessary insulation, removal and replacement of existing insulation. Such work shall be carried out by the RasGas insulation contractor.

7. OTHERS WORKING IN PROXIMITY

Contractor shall co-ordinate and maintain all RasGas requirements with any other Contractors who are working in close proximity to Contractors worksite activities.

8. CONTRACTOR'S SITE ESTABLISHMENT

- 8.1 Unless expressly stated in Section 3.0 – Scope of Work, RasGas makes no provision for the Contractor's site establishment. The Contractor shall therefore make all arrangements to source, set up and maintain any Contractor site establishment facility.
- 8.2 The RasGas shall have the right to inspect Contractor's proposed facilities and equipment, which the Contractor considers fit for the purpose. Prior to setting up the site establishment, the sitting and related facilities and equipment shall be subject to RasGas approval.

9. DRAWINGS AND DOCUMENTATION

- 9.1 The Contractor shall be responsible for the accuracy of all actual dimensions of work produced against dimensions shown on Company issued drawings. It is the Contractor's responsibility to advise the RasGas of any discrepancies.

**10. ACCESS**

- 10.1 Access to and from the Site will be through such gates and by such routes as will be defined by RasGas.. Access may be altered from time to time during the Contract Period and the Contractor accepts that any such inconvenience is accounted for in Contractor's rates.
- 10.2. Access to plant areas by Contractors vehicles and equipment is subject to restrictions as per the RasGas Permit to Work Procedure.

11. PUBLIC AND PRIVATE SERVICES

The Contractor shall protect, uphold and maintain all pipes, ducts, service mains, power/telephone buried cables, overhead cables etc, during the execution of the works. The Contractor is to make good any damage resulting from an act or failure to act for which the contractor is responsible at his own expense or pay all costs and charges in connection therewith, to the satisfaction of RasGas.

12. QUALITY ASSURANCE

- 12.1 The Contractor shall execute Works of the required quality by maintaining an effective documented Quality System.
- 12.2 Details of the Quality System shall be in the form of a Quality Manual (or similar document) produced by the Contractor which contains the relevant information.
- 12.3 When required by the Scope of Work Section 3.0 Contractor shall submit to RasGas a Quality Plan, which will satisfy the requirements of the Contract. Such plan shall be approved by RasGas prior to commencement of work activities.
- 12.4 The Quality Plan should include, but not be limited to:-
- The Contractor's Quality Organisation
 - Procedures for :-
 - Receipt, verification and security of free issue Materials from the Company's Stores.
 - Receipt, verification and security of Materials purchased by the Contractor.
 - Storage and segregation of such Materials in order that original identification of Materials of differing specification is retained.
 - Notification to RasGas of incorrectly supplied or faulty Materials.
 - All improperly installed and/or mislaid materials shall be replaced at Contractor expense.
 - Control of field activities which ensures that plans for and implementation of construction, erection and installation specifications are properly controlled in accordance with acceptable time constraints, levels of quality and commensurate with safe working practice.
- 12.5 All changes to the Quality Plan must be approved in writing by RasGas.
- 12.6 During the period of the Contract, the RasGas Representative shall have the right to visit the Contractor's head office or Site establishment in order to carry out quality assurance audit checks.

13. PUNCHLISTING

- 13.1 Contractor shall one week prior to completion of Work/Services provide RasGas with an interim certificate of completion identifying completed work and work in progress.



After inspection by RasGas and Contractor of completed work and work in progress RasGas may return to Contractor the interim completion certificate with a punchlist identifying any scope of works defects or deficiencies.

- 13.2 RasGas will have the right to carry out further checks on items included on the punchlist. Should RasGas find additional errors on or omissions from the punchlist then Contractor shall produce another punchlist at no cost to the Company. Contractor shall be required to re-mark all relevant work as having been subject to recheck.

14. COMPLETION OF WORKS/SERVICES

Once the Contractor believes that he has satisfactorily completed all of the Works/Services (or part if the contract so allows) then Contractor shall submit Notification of Intent to raise a Completion Certificate. If RasGas is satisfied that the Works/Services have been completed, RasGas will sign the appropriate Completion Certificate (Attachment - 07) raised by Contractor.

If RasGas believes that the Works/Services have not been completed RasGas will issue a Rejection of Completion of Certificate (Attachment - 08) setting out in what respect the Works/Services are not complete. This form will be discussed and agreed and signed by both the RasGas and Contractor.

15. FINAL CLEANING AND CLEARING

After completion of the work, Contractor shall transport all RasGas provided material to the Company's Stores or to any other place within the confines of the Ras Laffan LNG complex as directed by RasGas. Before the Contractor's personnel leave the Site they shall remove all temporary buildings and those Materials left over from the Work/Services which the Company does not wish to retain. The Contractor shall disconnect and dismantle all temporary wiring, piping, plumbing etc. and shall dispose of all rubbish and unwanted scrap in accordance with RasGas requirements, and shall leave the Site in a clean and orderly condition.

16. EHS POLICY STATEMENT FOR CONTRACTORS

NOTE: For the purpose of identifying Contractor Contractual Compliance for EHS requirements only, refer to Section 1.0 – Form of Agreement.

Should Section 7.0 – RasGas Environmental, Health and Safety requirements be included in Section 1.0 – Form of Agreement, then Section 7.0 shall take precedence over Section 5.0 – Preliminaries, only for RasGas EHS requirements (Refer Clause 16 through 22).

RasGas requires Contractors, whether individual entity or corporation, to manage their activities and supervise their employees in a manner that will ensure that work is performed in accordance with RasGas requirements and in a safe, environmentally sound and efficient manner. In addition to adhering to applicable Qatari laws and regulations, Contractors are required to develop safety procedures to be used by their supervisors and employees in the performance of their work. Contractors shall familiarize all of their employees with their safety procedures through routine safety meetings and the indoctrination of new employees to RasGas EHS policies and procedures.

RasGas' nominated representative shall have the authority to stop contractor's work whenever a clear and present danger occur or may occur to personnel or RasGas property. Expulsion of employees, or the removal of Contractor from RasGas property may be warranted if Contractor is found to be in breach of any of RasGas EHS requirements.



Contractor is hereby notified that the following are considered to be a breach of RasGas Environmental, Health and Safety requirements and as such will result in removal / expulsion from RasGas property. RasGas may notify Contractor verbally (verbal notification shall be confirmed in writing within Twenty Four (24) Hours of such notification) or in writing of any such breach and Contractor shall act immediately upon notification. RasGas shall also inform the competent public authority upon occurrence of any breach of RasGas requirements whenever such a breach constitutes a criminal offence under the applicable laws.

- Failure to comply with RasGas EHS Policies and Procedures.
- Smoking in non designated smoking areas,
- Theft
- Gambling,
- Fighting, or endangering physical welfare of personnel,
- Possession, or use of alcoholic drinks, or non prescription drugs,
- Obscene or reckless behaviour,
- Cameras/flash equipment (without valid permit)
- Violation of site traffic regulations, (speeding, disregard of traffic signage, parking in unauthorised areas, etc.)
- Using mobile phones within hazardous areas
- Using non-rated pagers within hazardous areas
- Carrying matches or lighters into Plant Areas
- Failure to use personal protective equipment as required.
- Bringing weapons or firearms onto facilities.
- Hooking up to utilities without permission.
- Running at RasGas' facilities except in case of an emergency
- Failure to promptly and properly report ALL injuries, incidents, near misses and emergencies.
- Operating vehicles or equipment without proper training qualification or without proper licenses or certificates.
- Improper use of vehicles or equipment
- Unauthorized use of RasGas tools, equipment and/or facilities.

When deemed necessary to remove any of Contractors employees, then the nominated RasGas Contract representative shall so instruct Contractor representative to immediately implement the required action.

17. GENERAL REQUIREMENTS

The Contractor shall be required to nominate one or more EHS Supervisor who is responsible for ensuring that the Work is performed in accordance with the applicable EHS requirements.

A resume from each on-site EHS supervisor must be submitted to both the RasGas Contract representative and RasGas EHS Department for review and approval. All on-site Contractor EHS supervisors shall be required to perform the following duties:

- Conduct daily site inspections of work practices and conditions
- Conduct daily toolbox safety talks on current EHS matters
- Conduct company EHS orientation training programs
- Conduct Accident and Incident Investigations
- Coordinate reporting of all incidents
- Coordinate Injury, Incident, Near Miss Record-keeping Requirements
- Attending weekly Contractor EHS Meetings

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- Keep the RasGas informed on compliance issues with new and existing EHS laws, regulations, internationally recognised standards

All Contractor's on site personnel shall be registered with the RLC Medical Clinic to ensure prompt treatment upon a medical emergency or other needed medical services. RasGas shall, if deemed necessary, review and inspect the Contractors accommodation and mess facilities.

17.1 Contractor "Kick-off" Safety Meetings

Contractor EHS Meeting shall be conducted prior to the commencement of the Contract Services.

The meeting shall be coordinated by the RasGas Contract representative and shall include participation by Contractor supervision and the RasGas EHS Department.

17.2 Contractor EHS Review Meetings

EHS review meetings may be called with Contractor when deemed necessary. Topics for discussion may include worksite inspection reports, incident reports, unsafe acts and conditions monitoring and safety procedural changes.

17.3 Contractor Toolbox Meetings

Contractors shall conduct Tool Box Meetings to communicate to employees EHS related issues, new EHS bulletins, and pertinent EHS policies and procedures, which affect the Services. Contractor shall maintain records of these meetings on file for inspection by the RasGas Contractor Representative and/or EHS Department Representative.

17.4 Language

Contractor is required to ensure the safety of the work force, the community and the environment. Clear, concise and understandable communications, particularly during an emergency situation, are critical elements in achieving this. All hazard communication and safety training takes place via written and verbal communications in the English language. Due to the critical need for this communication to take place effectively, RasGas has established a policy that all Contractor supervisory personnel must have the ability to reasonably understand, converse and write in the English language. Further, Contractor supervisory personnel must have additional language skills to ensure that they can communicate effectively with the rest of their contract workforce. This requirement is mandatory.

17.5 Contractor Training

The Contractor shall ensure that all its personnel have received the necessary health, safety, environment, survival and work related training. The Contractor shall ensure that certificates for mandatory training have been obtained prior to travel to any location to commence the services. (Refer also to Section 16 above.)

All Contractor personnel at the Site will be fully trained and currently qualified to carryout the work in accordance with safety related Company's regulatory and industry standards. The Contractor shall maintain training records including but not limited to: (1) employee identity; (2) training date & duration; (3) instructor name; (4) means to verify employees understanding of subject; (5) outline of material covered.

Where required by RasGas, Contractor shall ensure that all their employees including sub-contractors have been Hydrogen Sulphide/Breathing Apparatus (H2S/BA) trained. Such training must have been completed within the previous two years at a training provider acceptable to RasGas. Training from another provider may be acceptable provided that the Contractor is able to provide documentary evidence that such training has been carried out within the previous two years, that the BA training was carried out on Sabre Contour and Sabre ELSA equipment and that all personnel were competency assessed to assure their competence.

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Some companies that can provide required H2S/BA training for contractor personnel include but are not limited to

- Venture Gulf: Tele. 4602121, Fax. 4602244
- Marine Offshore: Tele. 4665250, Fax. 4665250
- Framton Safety: Tele. 4671546, Fax. 46715456
- Madina: Tele. 4600818, Fax. 4603143
- Mannai Corporation: Tele. 4601018, Fax. 4601091

17.6 Personnel/Trade Competency Training

RasGas may require training verification of all Contractor personnel through the use of written and/or practical tests. All testing shall be scheduled through the RasGas Contract Representative and must be satisfactorily completed before any Contractor commences work at RasGas work site.

RasGas may require some qualifications and skills to be verified informally on the worksite. Such verification may include monitoring by RasGas Contract Representative.

Documentation of Contractors personnel skills verification shall be provided by Contractor when requested by RasGas Contract Representative.

- a. Electricians and Instrument Technicians shall be required to pass a written examination and practical test administered by the RasGas Maintenance Department prior to performing work, which involves switching gear above 440 volts.
- b. Heavy Equipment Operators and Riggers shall be required to pass a written and practical examination administered by the RasGas Maintenance Department prior to performing work, unless deemed unnecessary by RasGas Contractor Representative.
- c. Welders must be ASME certified to a level appropriate to the service requirements.

17.7 Offshore Safety Training Requirements:

Contractors personnel must comply with RasGas safety training requirements and regulations for Offshore working and transportation by Helicopter to Offshore facilities.

While located at RasGas Offshore facilities Contractor Personnel will comply with all safety rules, regulations and Instructions including the participation when required in regularly scheduled safety Drills/Exercises.

17.7.1 With the exception of Helicopter Safety Briefing and RasGas Site Safety Induction, each Contractor is responsible for the provision of indicated safety training to its own employees (either directly or via contracted training provider) and at its own cost. Safety instruction / certification must be acceptable to RasGas.

RasGas withholds the right to review course materials and/or audit courses as it deems appropriate and to reject safety training which it believes to be inadequate. Such review by RasGas in no way relieves the Contractor of its responsibility to its employees for ensuring that safety training provided is fit for purpose.

Contractors must abide by RasGas safety standards as set out in the text of this *Preliminaries Section* of their contract with RasGas, as well as RasGas safety policies & procedures and commonly accepted safe working practices. Contract personnel must be made available for the purposes of attending selected RasGas provided safety training as required from time to time, without claim or charges being directed to RasGas for downtime or time spent. Such courses include but are not limited to RasGas Site Safety induction, Permit to Work training, etc. RasGas withholds the right to refuse access and/or transport to any of its facilities for persons whom do not meet specified safety training requirements.



- 17.7.2 All Contractor's must provide a general safety induction to their employees including but not limited to commonly accepted safe working practices, the proper use of and care for personal protective equipment (PPE) and equipment / tools, hazard recognition, reporting unsafe acts and conditions, reporting incidents / injuries and safe material handling.
- 17.7.3 RasGas Site Safety Induction will be provided to Visitors and Contractors that will visit or work in operating areas of the LNG Plant in Ras Laffan as well as the Offshore Platform Complex. A Site Safety Induction will be provided by the Drilling Contractor for Visitors, Contractors on Drilling Rigs under contract to RasGas. Personnel that will not enter operating areas of the facilities shall attend the site induction provided by their Contractor (e.g. Construction Safety Induction).

The RasGas Site Safety Induction shall normally be attended by persons entering operating areas upon their first visit to the Plant, Offshore Complex or Drilling Rig. Personnel are required to repeat the Site Safety Induction if a period of six (6) months has passed since their last site visit. RasGas may require any person to, attend or repeat the Site Safety Induction if significant procedural and/or facility modifications have been made and/or prior to special activities such as annual shutdowns. Advance notification to the RasGas is required for site visits.

- 17.7.4 There is a requirement prior to each helicopter flight (outbound / inbound) that a Helicopter safety video be shown by Gulf Helicopters.
- 17.7.5 It shall be required that, prior to first visit offshore or within one (1) week of working at Plant, each individual successfully complete Hydrogen Sulfide (H₂S) and Breathing Apparatus (BA) courses. Refresher training is required at the end of the Contractors personnel own course validity.

Personnel must carry valid RasGas certification card or they will not be allowed to travel offshore by Helicopter. RasGas H₂S / BA certification cards will be issued to visitors and contract personnel upon one (1) week advance written request and demonstration of successful completion of RasGas accepted course (i.e., front and back copy of valid certification card or certificate) and one (1) passport sized photo. Requests for RasGas H₂S / BA certification cards should be coordinated through the RasGas sponsoring department.

- 17.7.6 The requirement for completion of Basic Survival Training is determined by the cumulative number of days spent offshore per year. *Infrequent Visitors* offshore (including contractors and RasGas personnel) are defined as those personnel whom work no more than fourteen (14) days offshore during a calendar year. Infrequent visitors are not required to complete Basic Survival Training.

Frequent Visitors (including contractors) are defined as those persons whom work a cumulative total of fifteen (15) or more days offshore during a calendar year. Personnel whom anticipate that they will spend fifteen (15) or more days offshore during a calendar year should complete Basic Survival Training as soon as possible without waiting until they have achieved fifteen (15) days offshore. Personnel whom work on a regularly scheduled offshore rotation shall automatically be required to complete Basic Survival Training. Basic Survival Training shall be valid for a period of three (3) years and may be combined with Helicopter Underwater Escape Training (HUET).

- 17.7.7 The requirement for completion of Helicopter Underwater Escape Training (HUET) is determined by the cumulative number of trips offshore by helicopter during a calendar year. Infrequent Trips are considered to be no more than five(5) return trips offshore by helicopter. Persons whom make Infrequent Trips offshore by helicopter are not required to complete HUET training, however a "Buddy System" will be operated such that persons whom have not completed HUET training will be paired-up during the helicopter flight with a HUET trained passenger whenever possible.

Frequent Trips are considered to be six (6) or more return helicopter trips offshore during a calendar year. Personnel whom work on a regularly scheduled



offshore rotation shall automatically be required to complete HUET Training. HUET Training shall be valid for a period of three (3) years and may be combined with Basic Survival Training.

17.8 Housekeeping

The Contractor shall ensure that the works site is kept free of surplus, waste or redundant materials or items and shall maintain a clean and tidy work site throughout the duration of the services. All waste must be collected in appropriate containers, properly labelled and disposed of from the work site on at least a daily basis. Access ways and emergency exits shall be kept clear from obstructions at all times.

17.9 Environment

The Contractor shall comply with RasGas EHS requirements and all Health, Safety and Environmental regulations in accordance with the laws of State of Qatar.

Such environmental requirements shall include, protecting the environment by acting to preserve air, water, human life, animal and plant life from the adverse effects resulting from its work or operation of the services

17.10 EHS Equipment

The Contractor shall, at its own expense, provide adequate EHS equipment of an approved type and amount as required and appropriate for the execution of the contract works. The Contractor shall maintain this equipment in good working order and condition in line with any applicable laws and internationally recognised standards. Contractor shall keep up-to-date records of all such equipment for RasGas review from time to time and as deemed necessary by RasGas.

17.11 Personal Protective Equipment (PPE)

The Contractor shall provide and enforce the use of, adequate PPE, which shall be maintained in good condition and shall be replaced as and when necessary. The Contractor shall ensure that its workforce has received instructions on how to use and maintain as well as the limitations of any PPE.

All PPE provided shall be of a type approved by RasGas.

The Contractor shall maintain the PPE in good working order and condition in line with any applicable laws and internationally recognised standards. In addition the Contractor shall keep up-to-date records of all PPE issued for review by RasGas from time to time and as deemed necessary.

Contractor, entering and/or working Offshore or in any operating hydrocarbon or utility areas of RasGas Property including inlet receiving, gas process, acid gas removal, utilities, product storage, transfer loading or other operating areas of the Plant, must wear as a minimum, the following items at all times while on the worksite:

- hard hat
- safety shoes/boots
- long sleeve flame retardant coveralls (e.g. NOMEX)
- appropriate eye protection
- be in possession of hearing ear protection (use as appropriate)
- appropriate hand protection
- H2S detector toxi-clip

Personnel not normally working in the above defined hydrocarbon operating or utilities areas, but who may be required to respond to an emergency or enter the areas detailed above must wear the required minimum PPE prior to entering such areas.



Personnel working in warehouses, workshops, laboratories, garages and/or other areas outside the above detailed operating areas, must wear the same basic PPE together with exception of long sleeved coveralls made of 100% cotton (instead of flame retardant material).

Long sleeved 100% cotton coveralls may be worn by Contractor personnel in the Plant, associated areas, or Offshore only during shutdowns when the Plant is hydrocarbon free and as approved by RasGas. If Contractors personnel enter operating areas for any reason, the requirement for long sleeved flame retardant (e.g. Nomex) coveralls applies.

When Contractor Personnel are exposed to flying particles and intense light radiation (e.g. welding and burning, high noise, dust, toxic gases or fumes, chemicals, ionising radiation or any other potential workplace hazard) must wear Personal Protective Equipment specifically designed for the hazard involved.

Contractors Personnel working solely in a RasGas office environment are not normally required to wear Personal Protective Equipment unless:

- They enter any of the RasGas Receiving, Operating, Utility, Storage, Transfer, Loading or Maintenance Areas. This includes the Laboratory, Warehouses and other covered/enclosed work areas or if going offshore for any reason, no matter how short the duration.

17.12 Respiratory Protective Equipment

Contractors Personnel who may be required to use respiratory protection equipment **must** be able to achieve a face to mask seal as verified by qualitative fit testing. Fit testing will be conducted in accordance with the RasGas Respiratory Protection Equipment Fit Test Procedure.

Before using a respirator with a full face-piece, any head covering, glasses, facial jewelry, foreign items in the mouth and other items that may preclude a proper face to mask seal must be removed.

Such requirement shall apply to Contractors Personnel who:-

- may enter operating and associated areas of the plant
- required to work in areas with possible oxygen deficiency
- are assigned emergency response duties
- travel offshore

17.13 Hair Styles And Headdress

Hairstyles or headdress, that make it impossible for a person to properly wear a hard hat are **not** permitted and are deemed unacceptable by RasGas.

Contractors Personnel who work near moving machinery or rotating tools and equipment and whose long hair and/or beard constitute a hazard **must** tie back or secure their hair/beard by a net or similar means

17.14 Hazardous Materials

Contractor shall not bring on to site any hazardous materials without the prior written consent of RasGas.

Contractor shall maintain a library of current Material Safety Data Sheets for all hazardous materials brought on to site for RasGas review, unless deemed unnecessary by the RasGas Contract Representative

17.15 Smoking, Alcoholic Beverages And Drugs

Smoking is only permitted in designated smoking areas. The carrying of matches or cigarette lighters in hydrocarbon areas is strictly prohibited.



The carrying or consumption of any alcoholic beverage is strictly prohibited at RasGas property. Personnel under the influence of alcohol will be permanently removed from RasGas property.

Taking any kind of drugs unless under medical supervision is strictly prohibited.

Failure to comply with any of these conditions may require RasGas to instruct Contractor to remove any employee concerned or the Contractor from RasGas property.

17.16 Driving

17.16.1. Vehicles/Equipment and Driving Safety Rules

The Contractor shall comply with Qatar Traffic Rules and RasGas' vehicle/equipment safety requirements.

The Contractor shall provide motor vehicles in compliance with Qatar Traffic Rules and RasGas safety standards.

All heavy and light motor vehicles and machinery shall be made available to RasGas for safety checks and testing prior to commencement of Services on the worksite.

The Contractor shall ensure that only qualified and licensed/certified personnel are permitted to operate vehicles and equipment.

The Contractor shall ensure that all heavy machinery required for the Services (including but not limited to cranes, bulldozers, trucks, tractors, vehicles, etc) shall be properly certified, licensed, registered as well as fit for purpose, prior to and during the period of the Work.

The Contractor shall maintain an up to date register of drivers, type of driving license and approved test certificates for the duration of the Services.

Contractor Drivers/Operators of heavy machinery such as cranes, side booms, forklifts, and earth moving equipment, etc. providing the services may be tested and their competency verified by RasGas prior to commencing and during the services.

Contractor Drivers undergoing medical treatment, or having an injury such that their ability to drive is affected, shall not be permitted to drive until they have completely recovered and cleared by a licensed medical officer as fit to operate their vehicle.

All Contractor motor vehicles and equipment entering the Plant area shall display a RasGas vehicle inspection tag.

17.16.2 Contractor Vehicle and Equipment Requirements

All motor vehicles and other mobile equipment shall be certified, licensed, registered, fit for purpose, regularly inspected and well maintained in accordance with Qatari law and good driving practices.

The seats of vehicles and other mobile equipment shall be equipped with seat belts, preferably of the three fixed points type, which must be used by the driver and in vehicles all passengers prior to putting the device in motion.

Transporting personnel in the load area of vehicles or equipment is not permitted. In addition:

All Contractors vehicles shall comply with the following requirements:

- Vehicles shall be serviced regularly and maintained free from oil leaks
- Vehicles shall only be driven on proper roads and access ways
- All vehicles and mobile equipment shall be fitted with a suitable muffler system



- All motor vehicles, and mobile equipment shall be fitted with a suitable fire extinguisher

Consideration shall be given to the careful selection of motor vehicles, and mobile equipment suited to particular environmental protection requirements

17.16.3 Driving Rules

Breaches of any of the following traffic regulations will result in disciplinary action and/or removal from RasGas property:

1. exceed the posted speed limit
2. fail to wear seatbelts including all passengers
3. fail to observe posted instruction e.g. Stop sign, No Overtaking, etc.
4. carry personnel in load area of vehicle
5. driving in a manner liable to endanger other personnel or RasGas property
6. failing to observe the Plant Access and Permit to Work Procedures regarding vehicle entry into hazardous areas;

17.17 Heat Stress

Qatar has a very hot and humid climate with summer temperatures ranging from 25°C to 49°C and average relative humidity of 75%. This climate creates a potentially dangerous situation for those exposed to the heat; additionally the risk of accidents increases with extremely high temperature. At lower heat stress levels, the discomfort factor influences the workers to do whatever it takes to either get out of the hot area as soon as possible or modify the work process to reduce workload. At higher heat stress levels, mental confusion can develop and cause workers to perform unsafe acts.

During the high temperature summer months, contractor shall ensure that personnel are transported in well ventilated busses/vehicles to and from the worksite to reduce the effect of heat stress on employees.

It is Contractors responsibility to ensure a safe system of work, which addresses heat stress for all Employees.

18. EMERGENCY RESPONSE

The Contractor shall strictly observe the Plant Access Procedure. This procedure has been developed to establish the control of personnel access into the process areas of the onshore plant in order that in the event of an emergency, an accurate account of personnel in the plant can be verified

In the event of an emergency during the period of the work, the Contractor shall follow the RasGas Emergency Management System. The Contractor shall ensure that personnel are fully familiar with their roles and responsibilities in the event of an emergency.

In addition, Contractor shall maintain lifesaving, evacuation, rescue and medical equipment and other equipment and supplies required in an emergency in good working order and condition at all time. Contractor shall use its best efforts with all practicable means to control and prevent fires and explosions, injury to personnel, damage to equipment or property and environmental releases or spills. Without limitation on the foregoing, Contractor shall:

- a. Possess and maintain a written emergency plan applicable to the Work and Site; maintain documentation that this has been communicated to all personnel and Subcontractor personnel; and regularly schedule emergency drills in conjunction with Company emergency teams; written copies to be provided to the Company upon request;



- b. Maintain equipment in good operating condition and have emergency and first aid medical equipment ready and available for immediate use on Site, where applicable;
- c. Conduct equipment tests to ensure that equipment is properly placed and in good operating condition, and that personnel are able to respond to emergency situations and effectively operate the required emergency equipment.

19. SAFE WORK PRACTICES AND PROCEDURES

19.1 Permit To Work

All routine and non-routine work performed by Contractor that presents increased risks are subject to the issue of one or more of the Permits and Certificates listed below. RasGas approved Permits will only be issued to Contractor personnel who have successfully completed the RasGas Permit to Work training programme.

Such Permit to Work training shall include but not limited to:-

- a) For Cold Work
- b) For Hot Work
- c) For Confined Space Entry
- d) For Excavation

A certificate is required for any excavation that includes all and any work, which breaks the ground surface and extends below it, with the exception of designated garden areas where the depth of excavation does not exceed 200 mm.

During excavation work, should unidentified services, cables or pipelines be located, work must cease until RasGas Issuing Authority's approval is given for re-commencement.

19.1.1 For Radiation

Prior approval and permit must be obtained from RasGas and from relevant authority for the use, possession, movement or disposal of any radioactive substance at RasGas Property.

19.1.2 Application

Written application for any type of Permit shall be made by the Contractor (twenty four (24) hours) in advance of the proposed work commencing.

19.2 Electrical Equipment

19.2.1 Approval By RasGas

All electrical equipment shall be approved in writing by RasGas prior to the commencement of the Services.

19.2.2 Maintenance Of Equipment

It is the responsibility of the Contractor to install, use and maintain, all Contractors portable electrical equipment during the Services in a safe condition.

19.2.3 Electric Power Tools

Contractor shall ensure that wherever possible, low voltage equipment will be used. Equipment should be double insulated or used in conjunction with a residual current device (RCD) or ground fault circuit interrupter (GFCI). The RCD or (GFCI) if used shall be fitted as close as possible to the outlet.



19.2.4 Extension Leads

Contractor shall ensure that wherever possible the use of extension leads will be minimised. Where extension leads must be used then only braided, 3 core leads are acceptable.

19.2.5 Inspection By RasGas

All electrically operated tools may be subject to inspection by RasGas at any time and if any are found to be in an unsafe condition, then Contractor shall immediately tag "Do Not Use" and such defective tools will be either replaced or repaired, as directed and agreed by RasGas.

19.3 Contractors Lifting Equipment and Vehicle Inspection

The following applies to all Lifting Equipment / Vehicles used by Contractor on any Ras Gas Work Site. Contractor shall be responsible for Lifting Equipment / Vehicle Inspection as detailed below.

19.3.1 Contractors Lifting Equipment Services

These requirements shall ensure that all Lifting Equipment to be used by Contractors or Sub-Contractors on RasGas Worksites have been checked, are provided in accordance with relevant certificates standard(s) and comply with RasGas Lifting Equipment procedure prior to commencing the Services

19.3.2 Contractors shall comply with the following Lifting requirements

Prior to commencement of services on the Work Site, Contractor shall ensure that:

- a. Lifting Equipment is in good working order and free from defects.
- b. Each item of Lifting Equipment is clearly marked with Unique Identification Number and with the Safe Working Load or Maximum Gross Weight / Payload / Tare Weight
- c. The Contractor shall use a colour code system to identify all certified lifting gear. The Contractor shall post and ensure that all personnel are made aware of the current colour code.
- d. Each item has been thoroughly examined and subjected to Proof Load Test by one of above specified certifying authorities and certificate of examination /test shall be issued and available for RasGas review, if requested.
- e. Contractor shall maintain:
 - Up to date Register of Lifting Equipment certificates (Equipment certificates with validity date less than two weeks will be not acceptable for use at the RasGas.
 - Up to date Register of Crane operators, forklift operators, riggers and validity certificates. Validity date for all operators shall not be less than two months.
- f. Any of the following repair / replacement requirements that occur during the Contract period shall be reported to RasGas Representative. Such repairs and replacements shall include but not limited to:
 - Replacement of bearing elements on lifting equipment
 - Hook repair
 - Hoisting, Boom wire rope, Chain replacement
 - Split the lifting devices & assembly together (i.e., Chain Block, Roll Lift, etc.)
 - Replacement, welding of Crane Boom, lattices, etc.
 - Brakes repair, Brakes replacement or Brake parts replacement
 - Repair of Hydraulic systems for Lifting Equipment (i.e. out riggers seal replacement, main boom jack seal)

UK



- Repair or replacement of Safe Load Indicator.
- Any repair related to the strength or stability of the crane, fork lift or other lifting equipment shall be reported to the Contractor's supervisor and copied to RasGas Representative. After repair/ replacement, the Certifying Authority shall carry out a Thorough Visual Examination and witness Overload Proof/Test of the Lifting Equipment.

19.3.3 On site inspection of Lifting Equipment

- a. Prior to commencement of the services on worksite, RasGas representative will review all required documentation and certification and will visually inspect the Contractor's Lifting Equipment. **RasGas Representative may request Original Documentation & Certification to be presented for review.** True certified copies of which may be accepted for the RasGas' review purposes. All documents and certification shall be signed and stamped by the appropriate certifying authority.
- b. Any item(s) of Lifting Equipment delivered to the RasGas worksite without the required certification shall be deemed unacceptable to RasGas and therefore it is Contractor's responsibility to tag "Do Not Use", remove, replace or re-certify such equipment in accordance with the requirements specified herein. Uncertified equipment shall not be left at the Company site.

19.3.4 Re-certification of Equipment

It is the responsibility of the Contractor to arrange the re-certification of Lifting Equipment every six-months for loose gear (Loose Gear – e.g., Slings, Shackles and Chain Blocks.) and every year for Cranes and Forklifts, with a recognized Certifying Society.

19.3.5 Records

For all items of Lifting Equipment, the Contractor shall retain in a safe place on the worksite, copies of the current Proof Load Test certificates and valid Thorough Examination reports.

19.3.6 Onsite Surveys / Inspection

RasGas representative may carry out spot checks to ensure that Contractor is not using uncertified, out of date, or inadequately marked lifting equipment. Any such equipment shall be immediately removed from service and quarantined until all certifications have been verified and accepted by RasGas.

19.3.7 Uncertified Equipment

Any Contractor Lifting Equipment found on the worksite without the above-required certification shall be immediately removed from site until such time as the relevant documentation is provided by Contractor.

19.4 Tools

Contractors must ensure that employees have access to proper tools and equipment in order to perform the work in a safe manner. Contractors Personnel who use tools shall be properly trained to use, inspect/test and maintain tools safely.

19.5 Scaffolding

Contractor Scaffolding shall be erected, inspected and dismantled in accordance with RasGas requirements.

The Contractor shall –

- ensure that only well trained "certified" persons erect and dismantle scaffolding.



- provide a "competent person" to inspect scaffolding erections and alterations prior to use, and provide technical advice regarding scaffolding erections if required by RasGas .
- ensure that the "competent person" is well trained to British or equivalent Standards for Scaffolding Works.

19.6 Fall Protection

Contractor shall ensure that where any potential risk exists for injury of personnel due to falls, then physical controls will be in place to prevent such occurrence. The controls used shall be effective 100 percent of the time, i.e. this will require a body harness to be tied off 100 percent of the time (therefore use of dual lanyard devices with shock absorber shall normally be required).

For heights over two meters some form of physical fall protection controls shall be used.

For heights less than two meters the risks shall be assessed and appropriate fall protection controls applied.

19.7 Radioactive Substances

Contractor personnel may use radioactive material at RasGas worksite provided that prior approval has been given by RasGas and that all necessary licenses (permits) has been obtained from the relevant authority. The Company shall be satisfied that the use of radioactive material is justified and appropriate precautions are in place to manage any potential risks. The RasGas EHS Department is responsible for reviewing and approving Contractors' procedures before any work shall commence.

19.8 Job Safety Analysis (JSA)

RasGas requires Contractors to develop and document Job Safety Analyses for work that is to be undertaken. When selecting jobs to be analysed, several factors should be considered.

- Frequency of Accidents: A job that has repeatedly produced accidents is a candidate for a JSA.
- Severe Injuries: Every job that has produced disabling injuries should be given a JSA.
- Severity Potential: Some jobs may not have a history of accidents, but may have the potential for severe injury.

New work practices or tasks: New work practices or jobs created by changes in equipment or in work method that has accident potential shall require a JSA.

19.9 Energy Control (Lock-out/Tag-out)

Contractor shall implement an Energy Control (Lock Out/Tag Out) procedure meeting Company requirements for all work on equipment, which may inadvertently operate during test, repair or maintenance.

20. ENVIRONMENTAL CONTROL PLANS

The Contractor shall develop operational environmental plans and procedures. Such plans and procedures shall include but not be limited to the following:-

Strategic environmental control plan, which will describe in general terms the actions to be taken to protect the environment as the work progresses. This plan will be regularly updated and where applicable deal with:

✓



- Scheme for preparation of operational and emergency procedures for environmental conservation.
- Communication with RasGas with respect to compliance with environmental impact assessment reports and environmental permits.
- Communication with RasGas on environmental aspects of processes, equipment, HAZOP, planning and materials used.
- Development of instructions and procedures for environmental protection during the work
- Development of environmental audit/inspection procedure for this work.
- Development of monitoring, recording and reporting procedure for environmental performance and non-conformances.

21. WASTE DISPOSAL

Contractor shall comply with the following for safe and effective methods of waste disposal.

21.1 Domestic waste

Domestic waste such as kitchen/mess scraps, disposable cups, waste paper, etc. must be collected by cleaners and taken to a nominated disposal area, approved by RasGas, for disposal of contents.

21.2 Industrial / Construction waste

Industrial waste, which includes concrete, metal, timber and other waste of a non-hazardous nature shall be disposed of into industrial waste skips, which shall be located around the site. Once compacted and full, these skips shall be taken to a nominated disposal area, approved by RasGas, for disposal of contents.

21.3 Liquid waste

Liquid waste, which includes sewage sludge, oil and grease trap waste and general waste oil, shall be collected by an approved waste disposal Contractor and disposed of in a dedicated disposal area. Waste oils from machinery and plant are to be stored in drums and instructions/approval sought from RasGas for recycling.

21.4 Hazardous waste

To ensure that materials treated with hazardous chemicals do not become a hazard to the public, all such materials shall be disposed of in a safe manner. Operating Procedure shall include information on Personal Protective Equipment (PPE) required for handling the waste. These substances must be disposed of by the appropriate method advised by the site Environment, Health & Safety (EHS) Officer and approved by RasGas.

**21.5 Chemicals**

All chemicals and materials containing chemicals as constituents e.g. detergents must be considered controlled wastes from a disposal view point. These substances must be disposed of by the appropriate method advised by the site EHS Officer and approved by RasGas.

21.6 Contaminated Soil and Construction Spoil

Contaminated soil may be subjected to on site treatment or sent to a landfill site. Construction spoil consisting of soil and debris may be sent to an approved landfill site, as instructed by the site EHS Officer.

21.7 Banned Materials

Lead based paints and coatings as well as supplies and materials containing asbestos, PCB's (polychlorinated bi-phenols) and halogenated solvents are banned from and shall not be used on RasGas work sites.

21.8 Recycling/Reuse

The Contractor shall prepare and implement a material and waste-recycling program for oil, paper, metal, wood, plastic and other recyclable materials.

21.9 Hazardous Containers

Containers which have been used to store oil, chemicals or hazardous materials must be completely cleaned before recycling.

21.10 Other Wastes - General

Other waste materials, which do not clearly fall into one of the above categories, must only be disposed of after seeking approval by RasGas. All waste receivers shall sign to signify receipt of the wastes. A monthly data summary of the wastes collected shall be reported to RasGas. RasGas shall approve all waste disposal sites, transport methods to waste disposal sites and arrangements for all waste disposal sites. All waste disposal practices must also meet government regulations and standards.

22. EHS REVIEWS**22.1 Site Inspection / Job Planning**

Prior to commencement of the Work, the Contractor shall inspect the Site and ascertain whether any health or safety hazards exist. The Contractor will correct identified hazards before commencement of the Work or will take steps to prevent personnel exposure to the hazard. The Contractor will document this inspection and prepare Job Safety Plan to deliver to the Contractor's employees or Subcontractors in pre-job safety meetings. A copy of the document will be maintained at the Site and made available to the Company.

The Contractor shall conduct formal weekly job inspections by the Contractor's Site and safety managers utilizing preformatted checklists. The Company shall be permitted (but not required) to participate in the Contractor's inspections. The Contractor shall not cause, permit, or tolerate a hazardous, unsafe, unhealthy or environmentally unsound condition or activity over which it has control to be conducted at the Site. All unsafe conditions shall be promptly corrected and documented on inspection reports. All inspection reports shall be made available to the Company. Any conditions which can not be immediately corrected shall be brought to the attention of RasGas.



22.2 RasGas EHS Reviews

RasGas may if deemed necessary carry out EHS reviews over the course of the work or services performed.

Such reviews may include but not limited to:-

- Legislative and regulatory requirements
- Evaluation and registration of significant EHS effects
- Evaluation and registration of potential EHS impacts
- Assessment and evaluation of existing EHS practices and procedures
- Conformance with RasGas EHS procedures
- Feedback from previous incidents reports and aspects of non-compliance.

Handwritten signature or initials.



PART 2 - COORDINATION PROCEDURES

23. INTRODUCTION

The purpose of these Coordination Procedures is to give general information and directives to enable the Works or Services to be performed within the rules for communication between RasGas and contractors.

24. LANGUAGE

The contractual language shall be English for all correspondence by all parties involved including third parties.

25 DETAILED PROCEDURES

Where necessary the Contractor shall develop and submit to RasGas for approval a set of detailed coordination procedures appropriate to the project, works or services as the case may be. Such detailed procedures shall be written to comply with the general parameters set out in these general procedures.

26 RULES OF CORRESPONDENCE

26.1 Correspondence Generally

26.1.1 All correspondence shall be identified as follows:

Sender's reference
Recipient address
Attention: RasGas Representative (**Name T.B.A**)
Subject: Contract Title
Contract Number
Subject matter

Telephone :- (974) - TBA – Switch Board No.?

Facsimile :- (974) - TBA

26.1.2 Authorised RasGas Representative (Rep) Name shall be provided Post - Contract Award

26.1.3 All correspondence shall be limited to one subject.

26.1.4 Correspondence shall be sent by the most direct and fastest route. International mail shall be sent by courier.

26.2 Addresses

26.2.1 Company:-

26.2.1.1 Head Office:- Postal:-

RasGas Company Limited,
P. O. Box 24200,
Doha,
State of Qatar

Office:-

Mannai Tower,
West Bay,
Doha,
State of Qatar



26.2.1.2 Site:- Postal:- As Head Office address

Office:- As Head Office address

26.2.2 Contractor:- As per Name shown on Form of Agreement.

26.3 Telephone Calls

Telephone calls which could be a matter of record shall be confirmed in writing by the person originating the call.

26.4 Transmittals

26.4.1 Every document shall be distributed with a transmittal Attachment - 01 containing references, title, number of prints etc. Each transmittal shall be in respect of only one subject and shall clearly identify the attachments.

26.4.2 The transmittal form shall clearly indicate the purpose: For Approval, For Information, For Comment etc.

26.5 Numbering

All correspondence (letters, faxes, telexes, transmittals etc) shall quote a sequential reference number in the following format:-

AtB/XXX where A = an initial appropriate to the sending party (e.g. if RasGas the initial would be R)

t = means "to"

B = an initial appropriate to the destination party.

XXX = sequential number for the Contract or Call-Off Order if appropriate.

At award the Contractor and RasGas will agree the initials to be used.

26.6 Sequence Checking

An individual from each party shall be given the responsibility for maintaining a register of correspondence/transmittals. Every two weeks these individuals shall send to each other a fax stating the last reference number received and sent. The registers shall then be checked to establish whether or not any correspondence is missing.

27. MEETINGS

27.1 Agenda

The time, agenda, place and attendees of meetings shall be scheduled as far as possible by mutual agreement.

27.2 Minutes

Minutes of meetings shall be prepared by the Contractor. Copies of minutes should be distributed by the Contractor to the attendees of the meeting plus any other agreed recipients within two (2) working days of the meeting. Should any attendee disagree with the contents of the minutes details of the disagreement must be sent to the Contractor within (2) two working days of receipt of the minutes. If no disagreements are received by the Contractor within this period the minutes will be deemed to have been accepted, as written, by all parties. If the Contractor does not accept the disagreement as valid the



disagreement shall be annotated to reflect this, attached to the final minutes and distributed as before.

28. FORMS OF DOCUMENTS

28.1 Minimum Requirements

Some variation will be allowed in the general presentation of documents, but some information must be mentioned. In particular:-

- RasGas Contract number
- Document number
- Revision 0, 1, 2

28.2 Identification of Modified Text

Any modified paragraph shall be clearly indicated by a triangle with the number of the revision.

In the case of added pages, they shall be numbered as decimals of the page they follow i.e. 46.0, 46.1, 46.2, etc stating:-

- Date of the revision
- Number of the revision
- Number of the page

28.3 Double-Sided Printing

Where possible, the pages of documents shall be printed on both sides to decrease the thickness of documents.

28.4 Legibility

The characters of typewritten documents shall be clear and easy to read. Titles shall be printed with bigger characters for emphasis.

29. RAISING WORKS/SERVICES AGAINST "CALL-OFF" CONTRACTS

When RasGas authorized representative has identified works which are required via a "Call-Off" Order (e.g. Measured Term Contract) then RasGas shall;

- a) if the Works are to be measured and valued against schedules of rates :
 - raise a Call-Off Order (COO) using Attachment - 02 detailing the full extent of the Works required to be carried out ; or
- b) if the Works are sufficiently defined that a lump sum is appropriate :
 - issue details (scope, schedule, drawings, specifications etc.) to the Contractor, requesting that a lump sum quotation be submitted.
 - evaluate the quotation.
 - raise a COO based on the agreed quotation detailing the full extent of the Works.



30. FINAL PAYMENTS

Contractor Final Account will be established using Attachment - 03. The procedure is as follows:-

- a) When completion of the Works/Services has been certified in writing by RasGas. Contractor shall compile and submit a Statement of Final Account (complete with all necessary back-up) to the RasGas authorized Representative.
- b) The Contractor shall enter the agreed figures into Box 1 of Attachment - 03, sign Box 2 and submit the form to RasGas for review and approval.

31. CHANGES

31.1 When RasGas is considering varying the Works/Services:

31.1.1 A Change Order Notification (CON) Attachment - 04 is used. This form by itself does not constitute an ordered Change.

31.1.2 The procedure is as follows:-

- a) RasGas authorized Representative completes the number, contract data and Part A of the CON and issues the original to the Contractor.
- b) The Contractor completes Part B and returns the CON together with all back-up to the RasGas authorized Representative.
- c) If the RasGas authorized Representative decides that the Change Order is to be implemented then RasGas Representative will complete and sign a Change Order Instruction (COI) Attachment - 06 and issue the original to the Contractor.

31.2 When the Contractor believes that the Works/Services need to amended:

31.2.1 A Change Order Request (COR) Attachment - 05 is used.

31.2.2 The procedure is as follows:-

- a) The Contractor completes a (COR) and submits the original and one copy of it and all back-up to the RasGas authorized Representative.
- b) If the RasGas authorized Representative agrees that a Change Order is warranted then RasGas Representative will commence processing a Change Order Instruction (RGM/F/008). If the RasGas Representative does not agree that a Change Order is warranted RasGas will advise the Contractor accordingly.

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ATTACHMENTS

- 01 Transmittal
- 02 Call-Off Order
- 03 Final Account and Certificate for Balance Due
- 04 Change Order Notification
- 05 Change Order Request
- 06 Change Order Instruction
- 07 Completion Certificate
- 08 Rejection of Request for Completion Certificate

U6-

**Contract No. :**

Contract Title :

TM Ref. :

Date :

From :

To:

Attention :

[illegible]

Transmitted by :

Name :

Signature :

Received by :

Name :

Signature :

Date :

4.

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Attachment 01
Rev.0 June 03

EPAHQ120001915



RasGas Company Limited

CALL - OFF ORDER

No. _____

To :

Contract No. :

Description of * Works / Services :

Continuation sheets attached * Yes / No

List of Attached Drwgs/Specs/Documents :

Additional list attached * Yes / No

Reimbursement Basis : (Tick Appropriate Box)

Unit Rates

(If Lump Sum enter details in Words & Figures)

Reimbursable

Lump Sum :

Daywork

Other (specify)

This Call-Off Order to be completed by (Date) :

SAP Cost

Cost Centre/Work Order :

Cost Element :

Allocation :

Cost Centre/Work Order :

Cost Element :

For the purposes of this Call-Off Order only, the Engineer/Company Rep. shall be :-

Name :

Dept.:

Tel. No.:

Fax. No.:

Call-Off Order initiated by (to be completed by the person needing the Works/Services) :

Name :

Signature :

Date :

Call-Off Order authorised by (to be signed by an authorised signatory of the Company) :

Name :

Signature :

Date :

Completion Certification (to be completed by the Engineer/Company Rep.) :

I hereby certify that the above * Works / Services have been completed to my satisfaction.

Name :

Signature :

Date :

(* Delete as appropriate)

YH

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Attachment 02
Rev.0_June 03

EPAHO120001916



RasGas Company Limited

FINAL ACCOUNT AND CERTIFICATE FOR BALANCE DUE

Contract No. :

Contractor :

Contract Title :

Call-Off Number (if applicable) :

Box 1 - Statement of Final Account (to be completed by the Contractor) :

	<u>US\$</u>
- Contract/Call-Off Order Sum	
- *Add/*Deduct ordered Variations	
Sub - total	US\$
- *Add/*Deduct other *additions/*deductions	
TOTAL OF AGREED FINAL ACCOUNT	US\$
- Less :	
	<u>US\$</u>
Sum previously advanced	
Retention @%	
	()
BALANCE NOW DUE	US\$

Box 2 - Application (to be completed by the Contractor) :

I accept the above **TOTAL OF AGREED FINAL ACCOUNT** in full and final settlement of this
*Contract / *Call-Off Order.

Name :

Signature :

Date :

Box 3 - Valuation

I certify that the above **TOTAL OF AGREED FINAL ACCOUNT** is in accordance with the terms of
the Contract and I recommend acceptance of the offer in Box 2 above.

Name :

Signature :

Date :

Box 4 - Payment Certification (to be completed by the Company Rep.) :

I certify that the above **BALANCE NOW DUE** is due to the Contractor under the terms and
conditions of the Contract subject to verification of the sum previously advanced.

Name :

Signature :

Date :

Box 5 - Cost Allocations

Amount (US\$)	Cost Element	Cost Centre

(* Delete as appropriate)

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Attachment 03
Rev.0_June 03

EPAHO120001917



RasGas Company Limited

CHANGE ORDER NOTIFICATION

No. _____

Contract No. :

Contractor :

Contract Title :

Call-Off Order No. (if applicable) :

PART A (to be completed by the Engineer/Company Rep.)

1. Title of CON :

2. Description :

3. Basis of Payment :

Lump Sum

☐

Schedule of Rates

☐

Cost Reimbursable

☐

Other (define) :

☐

PART B (to be completed by the Contractor)

1. Cost Impact : US\$ _____

Insert other pertinent details here or attach separate sheet :

2. Schedule Impact :

Insert other pertinent details here or attach a separate sheet :

Signed for the Contractor :

Name :

Signature :

Date :

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Attachment 04
Rev.0_June 03

EPAHO120001918



RasGas Company Limited

CHANGE ORDER REQUEST

No.

Contract No. :

Contractor :

Contract Title :

Call-Off Order No. (if applicable) :

1. Proposed Title :

2. Description :

3. Relevant Correspondence (attach separate sheet if necessary) :

4. Cost Impact (if necessary attach a separate sheet with any further details) :

5. Schedule Impact (if necessary attach a separate sheet with any further details) :

Signed for the Contractor :

Name :

Signature :

Date :

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Attachment 05
Rev.0_June 03

EPAHO120001919



RasGas Company Limited

CHANGE ORDER INSTRUCTION

No: _____

Contract No. :

Contractor :

Contract Title :

Call-Off Order No. (if applicable) :

Corresp. *CON/*COR No. :

1. Title :

2. Scope :

3. Relevant Correspondence :

4. Change Order Price :

*Add / *Deduct

US\$

Other details (if necessary) :

5. Schedule Impact :

For RasGas :

Company Rep. :

Name :

Signature :

Date :

Approved by :

Name :

Signature :

Date :

(* Delete as appropriate)

Attachment 06
Rev.0_June 03

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EPAHO120001920



RasGas Company Limited

COMPLETION CERTIFICATE

CONTRACT NO.

CONTRACT TITLE

CONTRACTOR

EFFECTIVE DATE OF COMPLETION

In accordance with Clause of the above Contract, it is hereby certified by the Company that the Services / Works* have been completed to the satisfaction of the Company.

(* delete as appropriate)

FOR COMPANY

Name	Position	Signature	Date

Distribution :

Original - Contractor

Copies - Company Rep. ; Contracts Engg ; Finance (Contracts A/C)

Attachment 07

Rev.0 June 03

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EPAHO120001921



CONTRACT NO.	
CONTRACT TITLE	
CONTRACTOR	

In accordance with Clause of the above Contract, the Company hereby gives notice to the Contractor that a Completion Certificate shall not be granted until the part(s) listed below of the Services / Works* have been properly and fully completed. Upon such completion the Contractor shall further request a Completion Certificate in respect of the Services / Works*.

[illegible]

FOR COMPANY	FOR CONTRACTOR
Name :	Name :
Position :	Position :
Signature :	Signature :
Date :	Date :

Original - Contractor
Copies - Company Rep. ; Contracts Engg

EPAHQ120001922



SECTION 6.0

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SECTION 7.0

EHS REQUIREMENTS

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**RasGas Environmental, Health &
Safety Requirements for Contractors**

Document No: E04-X03RFC089
Issue No: Original
Date: June 2003

Group:	MD	Document No:	E04-X03-RFC 089
Department:	EHS	Revision:	Original

**RasGas Environment, Health & Safety Requirements for
Contractors**

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1.0 PURPOSE

This Procedure establishes the Environmental, Health and Safety (EHS) requirements for all Contracting and consulting Services performed at RasGas Property.

2.0 SCOPE

These EHS requirements shall apply to all Contractors and Consultants working at RasGas facilities. Contractors shall ensure compliance by their subcontractors with RasGas EHS requirements.

3.0 DEFINITIONS

The following words and phrases shall have the meaning assigned to them except where the context otherwise requires

3.1 SHALL

The word "shall" is to be understood as mandatory.

Note: The Contractor shall have procedures which meet with the requirements of RasGas standards and procedures, unless the Contractors' standards and procedures exceed the relevant approved RasGas standards and procedures.

3.2 HAZARDOUS AREA

An area in which there exists or may exist a flammable atmosphere. Hazardous Areas are classified under three headings:

Zone 0

A zone in which a "flammable atmosphere" is continuously present or it is likely to exist for long periods.

Zone1

A zone in which a "flammable atmosphere" is likely to occur under normal operating conditions.

Zone 2

A zone in which a "flammable atmosphere" is not likely to occur under normal operating conditions and if it does occur will only exist for a short period.

3.3 FLAMMABLE ATMOSPHERE

An atmosphere containing a quantity of flammable gas or vapour in a concentration capable of being ignited.

3.4 TOXIC ATMOSPHERE

An atmosphere containing material that will cause injury or death to personnel exposed to it without adequate protection.

UG -



3.5 HAZARDOUS MATERIAL

A substance (gas, liquid or solid) capable of creating harm to personnel, environment or RasGas property.

3.6 PERMIT TO WORK

Written consent issued by RasGas, to permit the Contractor to carry out the Work subject to specific terms and conditions to be observed by the Contractor prior and during performance of the Work having regards to the hazards of the particular Worksite.

3.6.1 Permitted work will be categorised as "Hot" or "Cold".

3.7 COLD WORK PERMIT

Cold Work is any work activity that does not involve a source or potential source of Hazardous Materials.

3.8 HOT WORK PERMIT

Any work activity involving a source or potential source of ignition.

3.9 CONFINED SPACE

Any wholly or partially confined space:

- Entry is possible; **AND**
- Access might be physically restricted; **AND**
- Egress is restricted or difficult; **AND**
- There is a risk of oxygen deficiency; **AND**
- There is a risk of, or accumulation of dusts, vapours or gases which are flammable or hazardous to health.

3.10 EXCAVATION

Excavation includes all and any work, which breaks the ground surface and extends below it, with the exception of designated garden areas where the depth of excavation does not exceed 200 mm. Excavation includes digging by manual or mechanical means.

3.11 ELECTRICAL EQUIPMENT

All plant, appliance and equipment designed for the generation, conversion, storage, distribution, transformation or use of electricity.

3.12 LIFTING EQUIPMENT

Any mechanical device capable of raising or lowering a load, e.g. cranes, forklift trucks, lifts, suspended cradles, powered hoists, Procedure hoists, lever hoists, rope hoists, beam trolleys, beam clamps, shear blocks, winches, runway beams.



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3.13 LIFTING GEAR

Any device whatsoever which is used or designed to be used directly or indirectly to connect a load to a Lifting Equipment and which does not form part of the load e.g. wire rope slings, chain slings, man-made fibre slings, hooks and fittings, swivels, shackles, eyebolts, rigging screws, wedge sockets, plate clamps.

3.14 COMPANY

RasGas Company Limited (RasGas) acting as agent for and on behalf of Ras Laffan Liquefied Natural Gas Company Limited, Ras Laffan Liquefied Natural Gas Company Limited (II), Al Khaleej Gas Project and any other entities or projects which might be managed or operated by RasGas.

3.15 CONTRACTORS

Referenced herein shall mean the Contractor, Subcontractor or Consultant providing the works/services as the case may be.

3.16 PROPERTY

Referenced herein shall mean RasGas' plant, machinery, buildings, structures, equipments, facilities and LNG operating facilities.

3.17 WORKSITE

Location or locations where Contractor is required to perform Contract Services or Works.

3.18 WORK

Services to be performed by Contractor, Subcontractor or Consultant.

3.19 E.H.S.

Abbreviation for "Environmental, Health and Safety "

4.0 POLICY STATEMENT FOR CONTRACTORS

RasGas is committed to the fundamental requirement that persons working at its facilities have a safe environment in which to perform their assigned Work.

All Contractors working at the RasGas Facilities shall comply with the requirements set forth in this document. Failure to comply with RasGas' requirements defined herein may result in expulsion of the Contractor and /or employees from the worksite.

RasGas requires Contractors whether individual entity or corporation, to manage their activities and supervise their employees in a manner that will ensure that work is performed in accordance with RasGas requirements and in a safe, environmentally sound and efficient manner. In addition to adhering to applicable Qatari laws and regulations, Contractors are required to develop safety procedures to be used by their



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supervisors and employees in the performance of their work. Contractors shall familiarize all of their employees with their safety procedures through routine safety meetings and the indoctrination of new employees to RasGas EHS policies and procedures.

RasGas' nominated representative shall have the authority to stop contractor's work whenever a clear and present danger occur or may occur to personnel or RasGas property. Expulsion of employees, or the removal of Contractor from RasGas' property may be warranted if Contractor is found to be in breach of any of RasGas' EHS requirements.

Contractor is hereby notified that the following are considered to be a breach of RasGas Environmental, Health and Safety requirements and as such will result in removal / expulsion from RasGas property. RasGas may notify Contractor verbally (verbal notification shall be confirmed in writing within Twenty Four (24) Hours of such notification) or in writing of any such breach and Contractor shall act immediately upon notification. RasGas shall also inform the competent Public Authority upon occurrence of any breach of RasGas requirements whenever such a breach constitutes a criminal offence under the applicable laws.

- Failure to comply with RasGas EHS Policies and Procedures.
- Smoking in non designated smoking areas,
- Theft
- Gambling,
- Fighting, or endangering physical welfare of personnel,
- Possession, or use of alcoholic drinks, or non prescription drugs,
- Obscene or reckless behaviour,
- Cameras/flash equipment (without valid permit)
- Violation of site traffic regulations, (speeding, disregard of traffic signage, parking in unauthorised areas, etc.)
- Using mobile phones within hazardous areas
- Using non-rated pagers within hazardous areas
- Carrying matches or lighters into Plant Areas
- Failure to use personal protective equipment as required.
- Bringing weapons or firearms onto facilities.
- Hooking up to utilities without permission.
- Running at RasGas' facilities except in case of an emergency
- Failure to promptly and properly report ALL injuries, incidents, near misses and emergencies.
- Operating vehicles or equipment without proper training qualification or without proper licenses or certificates.
- Improper use of vehicles or equipment
- Unauthorized use of RasGas tools, equipment and/or facilities.

When deemed necessary to remove any of Contractor's employees, then the nominated RasGas Contract representative shall so instruct Contractor representative to immediately implement the required action.

5.0 GENERAL REQUIREMENTS

5.1 Supervision & Manpower

UK



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5.1.1 The RasGas Sponsoring Department Contract representative shall, establish minimum contractor supervision/manpower ratios. Consideration shall be given to the following:

- Worksite access/egress
- Potential hazards of the job
- Job location within the property
- Complexity of the job
- Operating in hazardous areas
- Skill level of the craftsman
- Exposure to hazardous materials
- Availability of supervisor

5.1.2 Where the contract so requires, the Contractor shall nominate one or more person who is responsible for ensuring that the Work is performed in accordance with the applicable EHS requirements.

5.1.3 A resume from each on-site contractor EHS supervisor must be submitted to both the RasGas Contract representative and RasGas EHS Department for review and approval. All on-site contractor EHS supervisors shall be required to perform the following duties:

- Conduct daily site inspections of work practices and conditions
- Conduct daily toolbox safety talks on current EHS matters
- Conduct company EHS orientation training programs
- Conduct Accident and Incident Investigations
- Coordinate reporting of all incidents
- Coordinate Injury, Incident, Near Miss Record-keeping Requirements
- Attending weekly Contractor EHS Meetings
- Keep the RasGas informed on compliance issues with new and existing EHS laws, regulations, internationally recognised standards

5.1.4 All contractors on site personnel shall be registered with the RLC Medical Clinic to ensure prompt treatment upon a medical emergency or other needed medical services.

5.1.5 RasGas shall, if deemed necessary, review and/or inspect the contractor's accommodation and mess facilities.

5.2 Contractor "Kick-off" Safety Meetings

Contractor EHS Meeting shall be conducted prior to the commencement of the Contract Services.

The meeting shall be coordinated by the RasGas Contract representative and shall include participation by Contractor supervision and the RasGas EHS Department.

The purpose of the meeting is to discuss all aspects of the Services and as a minimum each meeting shall cover of the following topics:

- A review of the Method Statements for the work.
- A review of the Job Safety Analysis associated with the work

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- A review by the Contractor of all materials, to be utilized. . All Material Safety Data Sheets (MSDS) must be provided to RasGas prior to commencement of the services
- A review by the Contractor of their EHS program and employee EHS training. The Contractor shall provide documentation of the safety training received by all of their employees who will be performing the services
- Contractor shall comply with all RasGas Safe Work Practices, Procedures and the RasGas Emergency Management System, and all of the necessary Hazard Communication Information requirements.
- It is Contractor's responsibility to promptly inform both RasGas Contract Representative and RasGas EHS Department of any EHS concerns related to the services.

5.3 Contractor EHS Review Meetings

EHS review meetings may be called with Contractor when deemed necessary. Topics for discussion may include jobsite inspection reports, incident reports, unsafe acts and conditions monitoring and safety procedural changes.

5.4 Contractor Toolbox Meetings

Contractors shall conduct Tool Box Meetings to communicate to employees EHS related issues, new EHS bulletins, and pertinent EHS policies and procedures, which affect the Services Contractor shall maintain records of these meetings on file for inspection by the RasGas Contract Representative and/or EHS Department Representative.

5.5 Language

Contractor is required to ensure the safety of the work force, the community and the environment. Clear, concise and understandable communications, particularly during an emergency situation, are critical elements in achieving this. All hazard communication and safety training takes place via written and verbal communications in the English language. Due to the critical need for this communication to take place effectively, RasGas has established a policy that all Contractor supervisory personnel must have the ability to reasonably understand, converse and write in the English language. Further, Contractor supervisory personnel must have additional language skills to ensure that they can communicate effectively with the rest of their contract workforce. This requirement is mandatory.

5.6 Contractor Training

The Contractor shall ensure that all its personnel have received the necessary health, safety, environment, survival and work related training. The Contractor shall ensure that certificates for mandatory training have been obtained prior to travel to any location to commence the services.

All Contractor personnel at the Site will be fully trained and currently qualified to carry out the work in accordance with safety related Company's regulatory and industry standards. The Contractor shall maintain training records including but not limited to: (1) employee identity; (2) training date & duration; (3) instructor



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name; (4) means to verify employees understanding of subject; (5) outline of material covered.

Where required by RasGas, Contractor shall ensure that all their employees including sub-contractors have been trained in Hydrogen Sulphide/Breathing Apparatus (H2S/BA). Such training must have been completed within the previous two years at a training provider acceptable to RasGas. Training from another provider may be acceptable provided that the Contractor is able to provide documentary evidence that such training has been carried out within the previous two years, that the BA training was carried out on Sabre Contour and Sabre ELSA equipment and that all personnel were competency assessed to assure their competence.

Some companies that can provide required H2S/BA training for contractor personnel include but are not limited to

- Venture Gulf : Tele. 4602121, Fax. 4602244
- Marine Offshore: Tele. 4665250, Fax. 4665250
- Framton Safety: Tele. 4671546, Fax. 46715456
- Madina: Tele. 4600818, Fax. 4603143
- Mannai Corporation: Tele. 4601018, Fax. 4601091

5.6.1 Offshore Safety Training Requirements:

Contractors personnel must comply with RasGas safety training requirements and regulations for Offshore working and transportation by Helicopter to Offshore facilities.

While located at RasGas Offshore facilities Contractor Personnel will comply with all safety rules, regulations and Instructions including the participation when required in regularly scheduled safety Drills/Exercises.

5.6.1.1 With the exception of Helicopter Safety Briefing and RasGas Site Safety Induction, each Contractor is responsible for the provision of indicated safety training to its own employees (either directly or via contracted training provider) and at its own cost. Safety instruction / certification must be acceptable to RasGas.

RasGas withholds the right to review course materials and/or audit courses as it deems appropriate and to reject safety training which it believes to be inadequate. Such review by RasGas in no way relieves the Contractor of its responsibility to its employees for ensuring that safety training provided is fit for purpose.

Contractors must abide by RasGas safety standards, safety policies & procedures and commonly accepted safe working practices. Contract personnel must be made available for the purposes of attending selected RasGas provided safety training from time to time as required without claim or charges being directed to RasGas for downtime or time spent. Such courses



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include but are not limited to RasGas Site Safety induction, Permit to Work training, etc. RasGas withholds the right to refuse access and/or transport to any of its facilities for persons whom do not meet specified safety training requirements.

5.6.1.2 All Contractor's must provide a general safety induction to their employees including but not limited to commonly accepted safe working practices, the proper use of and care for personal protective equipment (PPE) and equipment / tools, hazard recognition, reporting unsafe acts and conditions, reporting incidents / injuries and safe material handling.

5.6.1.3 RasGas Site Safety Induction will be provided to Visitors and Contractors that will visit or work in operating areas of the LNG Plant in Ras Laffan as well as the Offshore Platform Complex. A Site Safety Induction will be provided by the Drilling Contractor for Visitors, Contractors on Drilling Rigs under contract to RasGas. Personnel that will not enter operating areas of the facilities shall attend the site induction provided by their Contractor (e.g. Construction Safety Induction).

The RasGas Site Safety Induction shall normally be attended by persons entering operating areas upon their first visit to the Plant, Offshore Complex or Drilling Rig. Personnel are required to repeat the Site Safety Induction if a period of six (6) months has passed since their last site visit. RasGas may require any person to attend or repeat the Site Safety Induction if significant procedural and/or facility modifications have been made and/or prior to special activities such as annual shutdowns. Advance notification to the RasGas is required for site visits.

5.6.1.4 There is a requirement prior to each helicopter flight (outbound / inbound) that a Helicopter safety video be shown by Gulf Helicopters.

5.6.1.5 It shall be required that, prior to first visit offshore or within one (1) week of working at Plant, each individual successfully complete Hydrogen Sulfide (H₂S) and Breathing Apparatus (BA) courses. Refresher training is required at the end of the Contractors personnel own course validity. Personnel must carry valid RasGas certification card or they will not be allowed to travel offshore by Helicopter. RasGas H₂S / BA certification cards will be issued to visitors and contract personnel upon one (1) week advance written request and demonstration of successful completion of RasGas accepted course (i.e., front and back copy of valid certification card or certificate) and one (1) passport sized photo. Requests for RasGas H₂S / BA certification cards should be coordinated through the RasGas sponsoring department.

5.6.1.6 The requirement for completion of Basic Survival Training is determined by the cumulative number of days spent offshore per year. *Infrequent Visitors* offshore (including contractors and RasGas personnel) are defined as those personnel whom work



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no more than fourteen (14) days offshore during a calendar year. Infrequent visitors are not required to complete Basic Survival Training.

Frequent Visitors (including contractors) are defined as those persons whom work a cumulative total of fifteen (15) or more days offshore during a calendar year. Personnel whom anticipate that they will spend fifteen (15) or more days offshore during a calendar year should complete Basic Survival Training as soon as possible without waiting until they have achieved fifteen (15) days offshore. Personnel whom work on a regularly scheduled offshore rotation shall automatically be required to complete Basic Survival Training. Basic Survival Training shall be valid for a period of three (3) years and may be combined with Helicopter Underwater Escape Training (HUET).

- 5.6.1.7 The requirement for completion of Helicopter Underwater Escape Training (HUET) is determined by the cumulative number of trips offshore by helicopter during a calendar year. Infrequent Trips are considered to be no more than five (5) return trips offshore by helicopter. Persons whom make Infrequent Trips offshore by helicopter are not required to complete HUET training, however a "Buddy System" will be operated such that persons whom have not completed HUET training will be paired-up during the helicopter flight with a HUET trained passenger whenever possible.

Frequent Trips are considered to be six (6) or more return helicopter trips offshore during a calendar year. Personnel whom work on a regularly scheduled offshore rotation shall automatically be required to complete HUET Training. HUET Training shall be valid for a period of three (3) years and may be combined with Basic Survival Training.

5.6.2 Personnel/Trade Competency Training

Due to the critical nature of the Services Contractors are required to perform at RasGas facilities, RasGas may require training verification of all Contractor personnel through the use of written and/or practical tests. All testing shall be scheduled through the RasGas Contract Representative and must be satisfactorily completed before any Contractor commences work at RasGas work site

RasGas may require some qualifications and skills to be verified informally on the worksite. Such verification may include monitoring by RasGas Contract Representative.

Documentation of Contractors personnel skills verification shall be provided by Contractor when requested by RasGas Contract Representative

- a. Electricians and Instrument Technicians shall be required to pass a written examination and practical test administered by the



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RasGas Maintenance Department prior to performing work, which involves switching gear above 440 volts.

- b. Heavy Equipment Operators and Riggers shall be required to pass a written and practical examination administered by the RasGas Maintenance Department prior to performing work, unless deemed unnecessary by RasGas Contract Representative.
- c. Welders must be ASME certified to a level appropriate to the service requirements.

5.7 Housekeeping

The Contractor shall ensure that the works site is kept free of surplus, waste or redundant materials or items and shall maintain a clean and tidy work site throughout the duration of the services. All waste must be collected in appropriate containers, properly labelled and disposed of from the work site on at least a daily basis. Access ways and emergency exits shall be kept clear from obstructions at all times.

5.8 Environment

The Contractor shall comply with RasGas EHS requirements and all Health, Safety and Environmental regulations in accordance with the laws of State of Qatar.

Such environmental requirements shall include, protecting the environment by acting to preserve air, water, human life, animal and plant life from the adverse effects resulting from its work or operation of the services

5.9 EHS Equipment

The Contractor shall, at its own expense, provide adequate EHS equipment of an approved type and amount as required and appropriate for the execution of the contract works. The Contractor shall maintain this equipment in good working order and condition in line with any applicable laws and internationally recognised standards. Contractor shall keep up-to-date records of all such equipment for RasGas review from time to time and as deemed necessary by RasGas.

5.10 Personal Protective Equipment (PPE)

Contractors performing work on behalf of RasGas, shall endeavour to eliminate any hazards as deemed reasonably practicable. However, when hazards cannot be removed, appropriate PPE must be utilized. PPE when selected, maintained and used properly helps to establish a measure of protection between the worker and the hazard, but it does not eliminate the hazard. Basic PPE is considered to be mandatory.

The Contractor shall provide and enforce the use of, adequate PPE, which shall be maintained in good condition and shall be replaced as and when necessary. The Contractor shall ensure that its workforce has received instructions on how to use and maintain as well as the limitations of any PPE.

All PPE provided shall be of a type approved by RasGas.



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The Contractor shall maintain the PPE in good working order and condition in line with any applicable laws and internationally recognised standards. In addition the Contractor shall keep up-to-date records of all PPE issued for review by RasGas from time to time and as deemed necessary.

Contractor, entering and/or working Offshore or in any operating hydrocarbon or utility areas of RasGas property including inlet receiving, gas process, acid gas removal, utilities, product storage, transfer loading or other operating areas of the Plant, must wear as a minimum, the following items at all times while on the worksite:

- hard hat
- safety shoes/boots
- long sleeve flame retardant coveralls (e.g. NOMEX)
- appropriate eye protection
- be in possession of hearing ear protection (use as appropriate)
- appropriate hand protection
- H2S detector toxi-clip

Personnel not normally working in the above defined hydrocarbon operating or utilities areas, but who may be required to respond to an emergency or enter the areas detailed above must wear the required minimum PPE prior to entering such areas.

Personnel working in warehouses, workshops, laboratories, garages and/or other areas outside the above detailed operating areas, must wear the same basic PPE together with exception of long sleeved coveralls made of 100% cotton (instead of flame retardant material).

Long sleeved 100% cotton coveralls may be worn by Contractor personnel in the Plant, associated areas, or Offshore only during shutdowns when the Plant is hydrocarbon free and as approved by RasGas. If Contractors personnel enter operating areas for any reason, the requirement for long sleeved flame retardant (e.g. Nomex) coveralls applies.

When Contractor Personnel are exposed to flying particles and intense light radiation (e.g. welding and burning, high noise, dust, toxic gases or fumes, chemicals, ionising radiation or any other potential workplace hazard) must wear Personal Protective Equipment specifically designed for the hazard involved.

Contractors Personnel working solely in a RasGas office environment are not normally required to wear Personal Protective Equipment unless:

- They enter any of the RasGas Receiving, Operating, Utility, Storage, Transfer, Loading or Maintenance Areas.. This includes the Laboratory, Warehouses and other covered/enclosed work areas or if going offshore for any reason, no matter how short the duration.

5.10.1 Respiratory Protective Equipment



Contractors Personnel who may be required to use respiratory protection equipment **must** be able to achieve a face to mask seal as verified by qualitative fit testing. Fit testing will be conducted in accordance with the RasGas Respiratory Protection Equipment Fit Test Procedure.

Before using a respirator with a full face-piece, any head covering, glasses, facial jewellery, foreign items in the mouth and other items that may preclude a proper face to mask seal must be removed.

Such requirement shall apply to Contractors Personnel who:-

- may enter operating and associated areas of the plant
- required to work in areas with possible oxygen deficiency
- are assigned emergency response duties
- travel offshore

5.10.2 Hair Styles And Headdress

Hairstyles or headdress that make it impossible for a person to properly wear a hard hat are **not** permitted and are deemed unacceptable by RasGas.

Contractors Personnel who work near moving machinery or rotating tools and equipment and whose long hair and/or beard constitute a hazard **must** tie back or secure their hair/beard by a net or similar means

5.11 Hazardous Materials

Contractor shall not bring on to site any hazardous materials without the prior written consent of RasGas.

Contractor shall maintain a library of current Material Safety Data Sheets for all hazardous materials brought on to site for RasGas review, unless deemed unnecessary by the RasGas Contract Representative

5.12 Smoking, Alcoholic Beverages And Drugs

Smoking is only permitted in designated smoking areas. The carrying of matches or cigarette lighters in hydrocarbon areas is strictly prohibited.

The carrying or consumption of any alcoholic beverage is strictly prohibited at RasGas property. Personnel under the influence of alcohol will be permanently removed from RasGas property.

Taking any kind of drugs unless under medical supervision is strictly prohibited. Failure to comply with any of these conditions may require RasGas to instruct the Contractor to remove any employee concerned or the Contractor from RasGas property.

5.13 Driving

5.13.1 Vehicles/Equipment and Driving Safety Rules



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The Contractor shall comply with Qatar Traffic Rules and RasGas' vehicle/equipment safety requirements.

The Contractor shall provide motor vehicles and equipment in compliance with Qatar Traffic Rules and RasGas safety standards.

All heavy and light motor vehicles and machinery shall be made available to RasGas for safety checks and testing prior to commencement of Services on the worksite.

The Contractor shall ensure that only qualified and licensed/certified personnel are permitted to operate vehicles and equipment.

The Contractor shall ensure that all heavy machinery required for the Services (including but not limited to cranes, bulldozers, trucks, tractors, vehicles, etc) shall be properly certified, licensed, registered as well as fit for purpose, prior to and during the period of the Work.

The Contractor shall maintain an up to date register of drivers, type of driving license and approved test certificates for the duration of the Services.

Contractor Drivers/Operators of heavy machinery such as cranes, side booms, forklifts, and earth moving equipment, etc. providing the services may be tested and their competency verified by RasGas prior to commencing and during the services .

Contractor Drivers undergoing medical treatment, or having an injury such that their ability to drive is affected, shall not be permitted to drive until they have completely recovered and been cleared by a licensed medical officer as fit to operate their vehicle.

All Contractor motor vehicles and equipment entering the Plant area shall display a RasGas vehicle inspection tag.

5.13.2 Contractor Vehicle and Equipment Requirements

All motor vehicles and other mobile equipment shall be certified, licensed, registered and fit for purpose, regularly inspected and well maintained in accordance with Qatari law and good driving practices.

The seats of vehicles and other mobile equipment shall be equipped with seat belts, preferably of the three fixed points type, which shall be used by the driver and all passengers prior to putting the device in motion.

Transporting personnel in the load area of vehicles or equipment is not permitted. In addition:

All Contractors vehicles shall comply with the following requirements:

- Vehicles shall be serviced regularly and maintained free from oil leaks
- Vehicles shall only be driven on proper roads and access ways
- All vehicles and mobile equipment shall be fitted with a suitable muffler system



- All motor vehicles, and mobile equipment shall be fitted with a suitable fire extinguisher
- Consideration shall be given to the careful selection of motor vehicles, and mobile equipment suited to particular environmental protection requirements

5.13.3 Driving Rules

Breaches of any of the following traffic regulations will result in disciplinary action and/or removal from RasGas property:

1. exceed the posted speed limit
2. fail to wear seatbelts including all passengers
3. fail to observe posted instruction e.g. Stop sign, No Overtaking, etc.
4. carry personnel in load area of vehicle
5. driving in a manner liable to endanger others, personnel or RasGas property.
6. failing to observe the Plant Access and Permit to Work Procedures regarding vehicle entry into hazardous areas;

5.14 The Use of Light Metal Alloys in Hazardous Areas

Contractor shall confirm the understanding that ignition of gas-air mixtures can occur as a result of impact or rubbing of metals. Impact between light metal alloys and rusty steel can produce sparks of high energy due to thermite reaction, which may ignite a flammable mixture.

As a safety precaution, light alloy ladders and scaffolding shall not be used in Zone 0 and 1 Hazardous areas.

5.15 Guards And Guarding Systems

The Contractor shall be required to keep in place all guarding systems provided by the manufacturer of the equipment/machinery to protect workers from inherent hazards associated with the operation of rotating machinery.

Electrical guarding systems shall be maintained in good order and operable. Bonding and earthing are essential to electrical safety. Electrical equipment is earthed primarily for the protection of Contractors personnel and secondly for the protection of the equipment. Moreover, earthing shall be checked and measured frequently and routinely with records maintained for these checks.

Guarding of stationary and mobile equipment shall be within manufactures limits and as recommended by the relevant standards and codes.

5.16 Heat Stress

Qatar has a very hot and humid climate with summer temperatures ranging from 25°C to 49°C and average relative humidity of 75%. This climate creates a potentially dangerous situation for those exposed to the heat; additionally the risk

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of accidents increases with extremely high temperature. At lower heat stress levels, the discomfort factor influences the workers to do whatever it takes to either get out of the hot area as soon as possible or modify the work process to reduce workload. At higher heat stress levels, mental confusion can develop and cause workers to perform unsafe acts.

Work in dry or moist heat poses a number of hazards. As long as personnel are in a protected environment the risk is minimal. However, when personnel step out into the extreme heat or humidity, there exist a number of potential hazards.

During the high temperatures of summer months Contractor shall ensure that personnel are transported in well ventilated busses/vehicles to and from the worksite to reduce the effect of heat stress on their employees.

It is, Contractors responsibility to ensure a safe system of work, which addresses heat stress for all Employees.

The hierarchy for providing a safe working environment in high heat is the same as exposure to any other dangerous substance. An effort should be made to substitute or engineer out the need to be exposed to heat, by automating outdoor tasks where practical or using fans or air conditioning. The second option would be to use Administrative controls such as limiting work to a cooler part of the day and modification of the work-to-rest ratio. The final option is to use personal protective equipment such as personal cooling devices.

The heat stress shall be monitored by WBGT (wet bulb globe temperature). Heat exposure shall be measured by a heat stress monitor complying with ISO 7243. The following table gives recommended work-rest regimes based on WBGT:

Workload			Work-rest routine (each hour)
Light	Medium	Heavy	
30.0	26.7	25.0	Continuous work
30.6	28.0	25.9	45 min work/15 min rest
31.4	29.4	27.9	30 min work/30 min rest
32.2	31.1	30.0	15 min work/45 min rest

Light workload: sitting or standing; inspecting or monitoring hot processes; walking in easily accessible areas; very light assembly operation; light control operations (e.g. buttons, hand wheels).

Medium workload: carrying or stacking light items; operating heavy controls (e.g. opening valves); cleaning or clearing light debris, spills etc.; walking in congested areas (e.g. limited head room), heavy welding.

Heavy workload: intense arm and trunk work; pushing or pulling heavily loaded cages or pallet trucks; heavy procedure handling; clearing heavy debris.

Rest locations should be ventilated and shaded. Contractor's Employees shall have an adequate supply of cool water available in rest location and encouraged to drink plenty of fluids to replace those lost during work activities.

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Shade, ventilation or air conditioning may be used to reduce the WBGT experiences in the workplace. Measurement shall be taken in the area of work activities. Power tools should be used when practical to reduce the physical workload. Metal tools should not be left in direct sunlight. Metal work surfaces and platforms should be shaded in work areas.

6.0 EMERGENCY RESPONSE

The Contractor shall strictly observe the Plant Access Procedure. This procedure has been developed to establish the control of personnel access into the process areas of the onshore plant in order that in the event of an emergency, an accurate account of personnel in the plant can be verified

In the event of an emergency during the period of the work, the Contractor shall follow the RasGas Emergency Management System. The Contractor shall ensure that its staff is fully familiar with their roles and responsibilities in the event of an emergency.

Contractor shall maintain lifesaving, evacuation, rescue and medical equipment and other equipment and supplies required in an emergency in good working order and condition at all time. Contractor shall use its best efforts with all practicable means to control and prevent fires and explosions, injury to personnel, damage to equipment or property and environmental releases or spills. Without limitation on the foregoing, Contractor shall:

- a. Possess and maintain a written emergency plan applicable to the Work and Site; maintain documentation that this has been communicated to all personnel and Subcontractor personnel; and regularly schedule emergency drills in conjunction with Company emergency teams; written copies to be provided to the Company upon request;
- b. Maintain equipment in good operating condition and have emergency and first aid medical equipment ready and available for immediate use on Site, where applicable;
- c. Conduct equipment tests to ensure that equipment is properly placed and in good operating condition, and that personnel are able to respond to emergency situations and effectively operate the required emergency equipment;

The Contractor shall comply with the following with regard to preventing fires:

- A. All flammable liquids, including petroleum products, paint thinners, or other flammable materials, shall be properly marked, stored and protected from damage.
- B. Work areas shall be kept clear of trash and other combustible materials.
- C. Trained Fire Watch personnel shall be in attendance wherever open flame hot work is in progress. Fire extinguishers, fire hoses or other fire-fighting equipment will be required to be readily available at the work site. Unless the contract expressly states otherwise, such fire-fighting equipment shall be provided by the contractor. The use of RasGas Unit fire extinguishers or hoses for purposes other than emergency situations is prohibited.



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6.1 Incident Reporting and Investigation

Unless otherwise expressly stated within the contract, the Contractor shall adopt the RasGas Incident Reporting procedure. At the end of every month and at the completion of the contract the Contractor shall prepare a summary report of its safety and environmental performance together with incident statistics and submit to RasGas EHS Department for review and acceptance.

7.0 SAFE WORK PRACTICES AND PROCEDURES

7.1 Permit To Work

All routine and non-routine work performed by Contractor that presents increased risks are subject to the issue of one or more of the Permits and Certificates listed below. RasGas approved Permits will only be issued to Contractor personnel who have successfully completed the RasGas Permit to Work training programme.

a) For Cold Work

Cold Work is any work activity that does not involve a source of ignition. This includes but is not limited to Procedure excavations to a depth of less than one metre, bolting and unbolting of pipeline and vessel flanges not containing flammable materials, removal of electrical and instrument equipment which has been de-energised or de-activated. A permit is not required for "work" that is restricted to visual inspection.

b) For Hot Work

Any work activity involving a source or potential source of ignition. Examples of hot work involving a source of ignition are welding, burning, grinding, electrical heat induction, disk cutting. Examples of hot work involving a potential source of ignition are: internal combustion engines; dry grit / shot blasting; needle gunning; use of non-certified electrical / electronic equipment; use of soldering irons; heat shrink blowers; steel wire brushes; use of battery powered cameras; work with X-ray radiation sources, any other activity where the possibility of heat generation or other a source of ignition may exist.

c) For Confined Space Entry

A confined Space Certificate is required for entry into a confined space which is defined as any enclosed or partially enclosed space where:

- Entry is possible; **AND**
- Access might be physically restricted; **AND**
- Egress is restricted or difficult; **AND**
- There is a risk of oxygen deficiency; **AND**
- There is a risk of, or accumulation of dusts, vapours or gases which are flammable or hazardous to health.

Doorways and other portals through which a person can walk are not to be considered limited or restricted means for entry or exit. However a space containing such a door or portal may still be deemed a confined space if an entrant's ability to escape in an emergency would be hindered.



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An "entry" is considered to have been made when any part of the body breaks the plane of an opening into the space.

Confined Spaces may include but are not limited to: -

- storage tanks, process vessels, boilers, pressure vessels, columns and other tank like compartments
- open-topped spaces such as pits or trenches
- pipes, sewers, shafts, ducts, pump sumps, valve pits
- fan enclosures, roof spaces, under floors, air ducts, furnaces, excavation greater than 1 metre in depth

d) For Excavation

A certificate is required for any excavation that includes all and any work, which breaks the ground surface and extends below it, with the exception of designated garden areas where the depth of excavation does not exceed 200 mm.

Excavation includes digging by hand or by mechanical means.

Excavation includes trenching, digging, boring, drilling, grading, pile driving or any other form of work likely to disturb the strata below the ground surface.

During excavation work, should unidentified services, cables or pipelines be located, work must cease until RasGas Issuing Authority's approval is given for re-commencement. The Issuing Authority will involve RasGas Engineering Department representative, so that the line can be identified and recorded.

e) For Radiation

Prior approval and permit must be obtained from RasGas and from the relevant Authority for the use, possession, movement or disposal of any radioactive substance at the RasGas property.

7.1.1 Application

Written application for any type of Permit shall be made by the Contractor (minimum twenty four (24) hours) in advance of the proposed work commencing.

7.2 Electrical Equipment

7.2.1 Approval By RasGas

All electrical equipment shall be approved in writing by RasGas prior to the commencement of the Services.

7.2.2 Certification

Contractor confirms acceptance that all electrical equipment for use within a hazardous area shall be selected according to British Standard BS 5345, which is summarised as follows:



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Zone	Type of Protection
0	"ia" Intrinsically safe apparatus or system "s" Special protection (specifically certified for use in Zone 0)
1	Any explosion protection suitable for Zone 0 and: "d" Flammable enclosure "ib" Intrinsically safe apparatus or system "p" Pressurisation, continuous dilution and pressurised rooms "e" Increased safety "s" Special protection
2	Any explosion protection suitable for Zones 0 or 1 and: "N" Type of protection "o" Oil-immersion "q" Sand filling

7.2.3 Maintenance Of Equipment

It is the responsibility of the Contractor to install, use and maintain, all Contractors portable electrical equipment during the Services in a safe condition.

7.2.4 Isolation From Mains

When not in use, it is the responsibility of the Contractor to ensure that all portable electrical equipment is isolated from the mains. The Contractor shall provide means of quick and effective isolation i.e. mechanically disconnected by unplugging, of all circuits.

7.2.5 Ingress Protection

Contractor shall ensure that all electrical equipment shall have a minimum rating of IP 54. In wet areas or areas liable to become wet, electrical apparatus shall be placed at a minimum height of 450mm above the ground.

7.2.6 Energising Temporary Supplies

Before energising temporary supplies, written permission shall be obtained by the Contractor from RasGas. The written permission shall be granted only after the installation has been inspected by a RasGas Authorised Person.

7.2.7 Electric Power Tools

Contractor shall ensure that wherever possible, low voltage equipment will be used. Equipment should be double insulated or used in conjunction with a residual current device (RCD) or ground fault circuit interrupter (GFCI). The RCD or (GFCI) if used shall be fitted as close as possible to the outlet.

7.2.8 Temporary Lighting

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Contractor shall ensure that only 24-volt, explosion proof (EX rated) temporary lighting is approved for use within confined spaces.

7.2.9 Extension Leads

Contractor shall ensure that wherever possible the use of extension leads will be minimised. Where extension leads must be used then only braided, 3 core leads are acceptable.

7.2.10 Alternative Shock Protection

Contractor shall comply with the following:

- a) Sensitive earth fault protection by means of a residual current device (RCD) or ground fault circuit interrupter (GFIC) operating at a maximum setting of 30mAmps.
- b) Double insulated equipment provided that the supply lead is fitted with protection as in a) above.
- c) Isolating transformer with a maximum supply cable length of 2 metres.
- d) Equipment outside these categories may be used subject to the approval by RasGas representative.

7.2.11 Non-Interchangeability

Contractor shall ensure that lamp holders, sockets, etc., shall be chosen such that equipment operating on different voltages is not interchangeable.

7.2.12 Second Earth Connection

Contractor shall ensure that regardless of any internal earth conductor, a second visible and effective earth connection consisting of separate flexible line of insulated copper wire of sufficient cross section must be fitted to those external metal parts of transportable electrical equipment, such as generators, transformers, switchgear, distribution gear and equipment which in the event of a "defect" may become live.

The separate earth connection shall be arranged so that it is made before the plug is inserted in the socket and not broken until the plug has been withdrawn from the socket

7.2.13 Inspection By RasGas

All electrically operated tools may be subject to inspection by RasGas at any time and if any are found to be in an unsafe condition, then Contractor shall immediately tag "Do Not Use" and such defective tools shall be either replaced or repaired, as directed and agreed by RasGas.

7.2.14 Safety Flashlights



Contractor shall ensure that only approved flashlights certified for hazardous areas shall be used in an Operating Area.

7.3 Contractors Lifting Equipment and Vehicle Inspection

The following applies to all Lifting Equipment / Vehicles used by Contractor on any Ras Gas Work Site. Contractor shall be responsible for Lifting Equipment / Vehicle Inspection as detailed below.

7.3.1 Contactors Lifting Equipment Services

These requirements shall ensure that all Lifting Equipment to be used by Contractors or Sub-Contractors on RasGas Worksites have been checked, are provided in accordance with relevant certificates standard(s) and comply with RasGas Lifting Equipment procedure prior to commencing the Services

7.3.2 Certifying Authorities

The following certifying authorities are recognized by RasGas:-

- Bureau Veritas
- Lloyds Register
- Velosi TUV Bayern ClassNK
- Germanischer Lloyd
- American Bureau of Shipping
- Det Norsk Veritas

7.3.3 For mobile cranes, forklift and other mobile lifting equipment the same certifying authority is required to carry out vehicle inspection, testing and certification of any lifting equipment.

7.3.4 *Contractors shall comply with the following Lifting requirements*
Prior to commencement of services on the Work Site, Contractor shall ensure that:

- a. Lifting Equipment is in good working order and free from defects.
- b. Each item of Lifting Equipment is clearly marked with Unique Identification Number and with the Safe Working Load or Maximum Gross Weight / Payload / Tare Weight
- c. The Contractor shall use a colour code system to identify all certified lifting gear. The Contractor shall post and ensure that all personnel are made aware of the current colour code.
- d. Each item has been thoroughly examined and subjected to Proof Load Test by one of above specified certifying authorities and certificate of examination /test shall be issued and available for RasGas review.
- e. Contractor shall maintain:
 - Up to date Register of Lifting Equipment certificates (Equipment certificates with validity date less than two weeks will be not acceptable for use at the RasGas.



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- Up to date Register of Crane operators, forklift operators, riggers and validity certificates. Validity date for all operators shall not be less than two months.
- f. Any of the following repair / replacement requirements that occur during the Contract period shall be reported to RasGas Representative

Such repairs and replacements shall include but not limited to:

- Replacement of bearing elements on lifting equipment
- Hook repair
- Hoisting, Boom wire rope, Chain replacement
- Split the lifting devices & assembly together (i.e., Chain Block, Roll Lift, etc.)
- Replacement, welding of Crane Boom, lattices, etc.
- Brakes repair, Brakes replacement or Brake parts replacement
- Repair of Hydraulic systems for Lifting Equipment (i.e. out riggers seal replacement, main boom jack seal)
- Repair or replacement of Safe Load Indicator.
- Any repair related to the strength or stability of the crane, fork lift or other lifting equipment shall be reported to the Contractor's supervisor and copied to RasGas Contract Representative. After repair/replacement, the Certifying Authority shall carry out a Thorough Visual Examination and witness Overload Proof/Test of the Lifting Equipment.

7.3.5 On site inspection of Lifting Equipment

- a. Prior to commencement of the services on worksite, RasGas representative will review all required documentation and certification and will visually inspect the Contractor's Lifting Equipment. **RasGas Representative may request Original Documentation & Certification to be presented for review. True certified copies of which may be accepted for the RasGas review purpose.** All documents and certification shall be signed and stamped by the appropriate certifying authority.
- b. Any item(s) of Lifting Equipment delivered to the RasGas worksite without the required certification shall be deemed unacceptable to RasGas and therefore it is Contractor's responsibility to tag "Do Not Use", remove, replace or re-certify such equipment in accordance with the requirements specified herein. Uncertified equipment shall not be left at the Company site.

7.3.6 Re-certification of Equipment

It is the responsibility of the Contractor to arrange the re-certification of Lifting Equipment every six-months for loose gear (Loose Gear – e.g., Slings, Shackles and Chain Blocks.) and every year for Cranes and Forklifts, with a recognized Certifying Society.

7.3.7 Records



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For all items of Lifting Equipment, the Contractor shall retain in a safe place on the worksite, copies of the current Proof Load Test certificates and valid Thorough Examination reports.

7.3.8 Onsite Surveys / Inspection

RasGas representative may carry out spot checks to ensure that Contractor is not using uncertified, out of date, or inadequately marked lifting equipment. Any such equipment shall be immediately removed from service and quarantined until all certifications have been verified and accepted by RasGas.

7.3.9 Uncertified Equipment

Any Contractor Lifting Equipment found on the worksite without the above-required certification shall be immediately removed from site until such time as the relevant documentation is provided by the Contractor.

7.4 Operational Requirements

7.4.1 Contractor Crane Operational Requirements.

- a) Cranes will only be operated by persons who are properly trained and qualified and hold a valid licence.
- b) No Crane Operation will take place without an appointed, identifiable competent rigger and signalman.
- c) No Crane Operation will take place without an adequate system of communication between the Crane Driver and the signalman.
- d) The hoisting mechanism of a crane shall not be used for any purpose other than lifting a load vertically.
- e) Cranes shall not be used to transport loads, unless specifically designed for this purpose. The hook of a crane must be secured to prevent it swinging when the crane is in transit.
- f) Mobile Jib Cranes, side booms and 'A' frames shall not work in the vicinity of overhead Power lines unless a safe working distance of total length of the jib plus 3 metres is maintained.
- g) Cranes of one ton or more lifting capacity shall be fitted with an Automatic Safe Load Indicator, a Radius Indicator, and a Crane Capacity Chart displayed in the operator's cabin.
- h) The Contractor shall submit a lifting plan for approval by the RasGas Contract Representative.
- i) Passengers are forbidden from riding on/in cranes.
- j) The operator must remain in the cab of the crane with seat belt properly secured whenever there is a load on hook or the crane is being moved.

7.4.2 Contractor Fork Lift Trucks Operational Requirements

- a) Industrial Fork Lift Trucks shall not be used to lift a load greater than the maximum rated safe working load permitted for the truck.



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- b) Passengers are forbidden from riding on Fork Lift Trucks.
- c) Fork Lift Trucks shall only be driven and operated by persons so trained, qualified and licensed.
- d) Load handled or transported by forklift trucks must be properly secured and/or palletted.
- e) No rigging gear is permitted on the forks of the lift truck unless it is a properly certified and rated fork mounted jib.
- f) No loads or equipment may be transported in or partially in the cab of the lift truck.
- g) The operator must remain in the cab of the lift truck with seat belt properly secured whenever there is a load on the forks or the lift truck is being moved.

7.5 Compressed Gas Cylinders

Compressed gas cylinders shall be used, stored and transported in accordance with RasGas requirements.

7.6 Tools

Contractors must ensure that employees have access to proper tools and equipment in order to perform the work in a safe manner. Contractors Personnel who use tools shall be properly trained to use, inspect/test and maintain tools safely.

7.7 Scaffolding

Contractor Scaffolding shall be erected, inspected and dismantled in accordance with RasGas requirements.

The Contractor shall –

- ensure that only well trained "certified" persons erect and dismantle scaffolding.
- provide a "competent person" to inspect scaffolding erections and alterations prior to use, and provide technical advice regarding scaffolding erections if required by RasGas .
- ensure that the "competent person" is well trained to British or equivalent Standards for Scaffolding Works.

7.8 Ladders

The Contractor shall ensure that employees who use ladders must be trained in proper selection, inspection, use and storage.

7.9 Fall Protection

Where any potential exists for injury of personnel due to falls, there shall be physical controls in place to prevent such occurrence. The controls used shall be effective 100 percent of the time, i.e. this will require a body harness to be tied off 100 percent of the time (therefore use of dual lanyard devices with shock absorber shall normally be required).



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For heights over two meters some form of physical fall protection controls shall be used.

For heights less than two metres the Risks shall be assessed and appropriate fall protection controls applied.

All equipment used to provide fall protection shall be certified as fit for purpose, i.e. scaffold built by competent personnel using certified material, body harnesses, lanyards and associated equipment maintained as per manufacturer's specifications and inspected (with records maintained) prior to use by Contractor.

The personnel using the fall arrest equipment shall have completed training and be able to demonstrate competence in its use.
Only full body harnesses are approved by RasGas for use by Contractor.

7.10 Radioactive Substances

Contractor personnel may use radioactive material at RasGas worksite provided that prior approval has been given by RasGas and that all necessary licenses (permits) have been obtained from the relevant Authority. The Company shall be satisfied that the use of radioactive material is justified and appropriate precautions are in place to manage any potential risks. The RasGas EHS Department is responsible for reviewing and approving Contractors' procedures before any work shall commence.

7.11 Job Safety Analysis (JSA)

RasGas requires Contractors to develop and document Job Safety Analyses for work that is to be undertaken. When selecting jobs to be analysed, several factors should be considered.

- Frequency of Accidents: A job that has repeatedly produced accidents is a candidate for a JSA.
- Severe Injuries: Every job that has produced disabling injuries should be given a JSA.
- Severity Potential: Some jobs may not have a history of accidents, but may have the potential for severe injury.

New work practices or tasks: New work practices or tasks created by changes in equipment or in work method that have accident potential shall require a JSA.

7.12 Energy Control (Lock-out/Tag-out)

Contractor shall implement an Energy Control (Lock Out/Tag Out) procedure meeting Company requirements for all work on equipment, which may inadvertently operate during test, repair or maintenance.



8.0. ENVIRONMENTAL MANAGEMENT TECHNIQUES AND PROCEDURES

Contractors commitment will be expressed through allocation of resources, setting standards, systematic review of performance including inspection and monitoring, active follow up of any unsound conditions and reporting of any incidents to RasGas concerning the environment. Unless otherwise advised Contractor shall comply with the following as a minimum:-

8.1 Environmental Control Plans

The Contractor shall develop operational environmental plans and procedures. Such plans and procedures shall include but not be limited to the following:-

8.1.1 Strategic environmental control plan, which will describe in general terms the actions to be taken to protect the environment as the work progresses. This plan will be regularly updated and where applicable deal with:

- Scheme for preparation of operational and emergency procedures for environmental conservation.
- Communication with RasGas with respect to compliance with environmental impact assessment reports and environmental permits.
- Communication with RasGas on environmental aspects of processes, equipment, HAZOP, planning and materials used.
- Development of instructions and procedures for environmental protection during the work
- Development of environmental audit/inspection procedure for this work.
- Development of monitoring, recording and reporting procedure for environmental performance and non-conformances.

8.1.2 Environmental Control action plans with realistic measurable targets, describing in general terms the aims and targets to be achieved. Such activities shall include those actions required to comply with external regulations and RasGas environmental procedures.

8.2 Environmental Training and Awareness

Contractor staff must be aware, informed and trained to perform their daily activities in an environmentally responsible way. Promotion of awareness will be achieved by:

- Induction courses
- Field site surveys to activate plans and check conformance
- Environmental conservation and protection instructions
- Written notification of potential environmental concerns and/or non-conformances.
- Training Courses

Handwritten signature/initials



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All Contractor personnel employed on or visiting the RasGas Property will undergo a brief environmental induction course, at the same time they undertake their safety induction.

The environmental training course will cover the following subject areas:

- Project Environmental policy
- Contractor involvement and commitment for pollution prevention
- Oil and Chemical spills
- Waste management
 - Segregation
 - Containers
 - Marking labelling
 - Recycling
 - Disposal
 - Transportation
- Noise Control
- Fire Prevention and Control
- Waste water quality/treatment
- Environmental reviews and audits
- Contingency and Emergency Response Plan for environmental releases
- Hazardous material labelling and management

8.3 Communication

Environmental matters will be covered as a standing agenda item during Contractor safety (EHS) meetings. The objectives of these meetings include housekeeping and the resolution of any concerns or problems that emerge (e.g. unsound conditions, incidents).

8.4 Performance Measurement and Appraisal

Contractor shall provide systematic monitoring, measuring and reporting of environmental performance for effective management and control. This shall include but not limited to:

a) Monitoring and measuring of performance

- Measuring and recording of quantitative information, such as amounts and concentrations of emissions, solid and liquid wastes, number of spills, number and extent of deviations from compliance with regulatory requirements.
- Good housekeeping/waste management records
- Number of staff receiving environmental induction and refresher/updates inductions
- Environmental management measures implemented.
- Qualitative assessment of the extent and severity of any impacts
- Environmental audits and inspections

b) Reporting of Performance



Internal performance reporting to RasGas will be applied to measure the results of action plans and to determine whether adjustments achieve desired performance improvements.

8.5 Specific Environmental Issues And Control Methods

Potential environmental impacts and associated controls/corrective activities that the Contractor shall incorporate into work procedures shall include but not limited to:

8.5.1 Oil / Chemical Spills

Oil spills can occur as a result of the following activities or hazards:

- Ruptures due to excessive heat and/or fire
- Failure of instrumentation/controls for overflow systems
- Pipe, spool and joint failures
- Leaks from machinery and motor vehicles
- Leaks from tanks drums or containers due to puncturing
- Leaks from taps/valves due to failure of, or accidental, or purposeful opening
- Failure of connections/couplings due to poor design or incorrect connections
- Blockage of drains and open flow lines
- Failure of pipework, containers and equipment due to corrosion
- Failure of storage tanks due to excessive differential settlement
- Leaks from storage tanks

8.5.2 Prevention and Containment of spills

Spills will be prevented or contained by the following means: -

- Professional and rigorous design of all equipment including built in leak detection
- Formal inspections of equipment containing oil
- Use of correctly banded bulk oil storage facilities
- Where bulk storage is not possible, oil drums and containers to be stored on wooden pallets in banded areas
- Scheduled inspections and maintenance of all motor vehicles and mobile equipment
- Use of absorbent material to contain and aid in the clean up of oil spills
- Use of "drip" trays to catch and contain leaks
- Use of drum lifting devices to lift and carry drums
- Use of soil to prevent large oil spills spreading to water ways



- Correct waste disposal practices
- Training of supervisors and managers in above requirements
- Use of impermeable membranes to catch oil leaks and to stop the volatile products migrating through the sub soil and into the water table.

8.5.3 Marine Oil Spills

Marine oil spills will be prevented or contained by the following means: -

- Professional and rigorous design of all equipment
- Hydrostatic testing of all pipes and associated fittings
- Review of correct operation of process controls prior to commissioning of new facility
- Provision of bundling on vessels to prevent discharge of oil.
- Provision of oily-water separator on vessels to prevent discharge of oil with bilge water.
- Use of correct drum/container lifting equipment when lifting and transferring drums/containers.
- Contain oil spills on decks of vessels and correctly dispose of waste by mopping up and placing in bags or containers for delivery to shore.
- Ensuring that all employees associated with marine activities are to be briefed regarding the necessary requirements and are instructed in correct oil spill response and reporting procedures.
- Proper lines of communication established via radio or telephone to ensure major oil spills are reported expediently to the control room or person(s) in charge of operations.
- Above requirements are communicated to Sub-Contractors in written contracts and communiqués to ensure compliance.

8.5.4 Chemical Spills / Releases (Hydro testing)

Chemical spills or releases will be prevented by the following means:

- Correct storage of chemicals in line with requirements of material safety data sheets (MSDS).
- Storage of chemicals in correctly labelled and designed containers.
- Use of "bonding" to prevent static explosion where required.
- Use of bunding around chemical storage area / compound.
- Chemical handling and transfer to be undertaken by trained employees.
- Chemicals / hydrated fluids to be disposed of in line with recommended safe practices for handling and disposal of such chemicals.
- Chemical spillage or waste will be collected and disposed of safely and without harm to the environment.

SA



- Containment of hydrostatic fluids, at conclusion of test(s), for safe disposal.
- Containment of drying chemicals, i.e. where methanol is used at completion of hydro testing.
- Training of employees in chemical spill response and reporting requirements

Where chemicals are used during hydrostatic testing, telephone and/or radio communication will be maintained to ensure that any chemical leak is controlled expediently, immediately following detection.

8.5.5 Noise

Noise from construction activities will be minimised by use of the following controls: -

- Where practicable use of acoustic shields to contain and dampen noise.
- Fitting of mufflers to all combustion engines and pneumatic devices.
- Effective maintenance of plant and equipment to ensure that it does not produce excessive noise due to worn or faulty parts.
- Conducting of noise surveys to determine noise levels and appropriate controls.
- Training of personnel in correct use of equipment fitted with noise control devices.
- Employ engineering practices, which will help reduce noise i.e., use of hydraulic pile driving etc.

8.6 Waste Disposal

Contractor shall comply with the following for safe and effective methods of waste disposal.

8.6.1 Domestic waste

Domestic waste such as kitchen/mess scraps, disposable cups, waste paper, etc. must be collected by cleaners and taken to a nominated disposal area, approved by RasGas, for disposal of contents.

8.6.2 Industrial / Construction waste

Industrial waste, which includes concrete, metal, timber and other waste of a non-hazardous nature shall be disposed of into industrial waste skips, which shall be located around the site. Once compacted and full, these skips shall be taken to a nominated disposal area, approved by RasGas, for disposal of contents.

8.6.3 Liquid waste

Liquid waste, which includes sewage sludge, oil and grease trap waste and general waste oil, shall be collected by an approved waste disposal



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Contractor and disposed of in a dedicated disposal area. Waste oils from machinery and plant are to be stored in drums and instructions/approval sought from RasGas for recycling.

8.6.4 Hazardous waste

To ensure that materials treated with hazardous chemicals do not become a hazard to the public, all such materials shall be disposed of in a safe manner. Operating Procedures shall include information on Personal Protective Equipment (PPE) required for handling the waste. These substances must be disposed of by the appropriate method advised by the site Environment, Health & Safety (EHS) Officer and approved by RasGas.

8.6.5 Chemicals

All chemicals and materials containing chemicals as constituents e.g. detergents must be considered controlled wastes from a disposal view point. These substances must be disposed of by the appropriate method advised by the site EHS Officer and approved by RasGas.

8.6.6 Contaminated Soil and Construction Spoil

Contaminated soil may be subjected to on site treatment or sent to a landfill site. Construction spoil consisting of soil and debris may be sent to an approved landfill site, as instructed by the site EHS Officer.

8.6.7 Banned Materials

Lead based paints and coatings as well as supplies and materials containing asbestos, PCB's (polychlorinated bi-phenols) and halogenated solvents are banned from and shall not be used on RasGas work sites.

8.6.8 Recycling/Reuse

The Contractor shall prepare and implement a material and waste-recycling program for oil, paper, metal, wood, plastic and other recyclable materials.

8.6.9 Hazardous Containers

Containers which have been used to store oil, chemicals or hazardous materials must be completely cleaned before recycling.

8.6.10 Other Wastes - General

Other waste materials, which do not clearly fall into one of the above categories, must only be disposed of after seeking approval by RasGas. All waste receivers shall sign to signify receipt of the wastes. A monthly data summary of the wastes collected shall be reported to RasGas. RasGas shall approve all waste disposal sites, transport methods to waste disposal sites and arrangements for all waste disposal sites. All waste disposal practices must also meet government regulations and standards.



8.7 Emergency Contingency Planning

Contractor's preparedness for environmental emergency consequences (e.g. large oil / chemical spill, leaking storage tank or pipelines) includes:

- Preparatory measures (identification of sensitive features, construction of containment areas, purchase of equipment, clean-up resources, etc).
- Testing of equipment and response personnel.
- Contractual arrangements.
- Co-operation with relevant authorities and emergency services where appropriate.

8.8 Environmental Records

Contractor's nominated/authorised person shall keep and maintain environmental records in order to demonstrate and provide evidence of the ongoing operation and management of the environment policy and program.

In addition to the requirement to maintain statutory records (where applicable), records will also be maintained in respect of: -

- Details of deviation with the RasGas policy or procedures and the corrective actions taken.
- Details of any incidents and follow-up actions taken.
- Details of any complaints and follow-up actions taken.
- Appropriate supplier and Contractor information.
- Inspection, test and maintenance reports
- Product composition and identification data.
- Emission/discharge monitoring data
- Waste characterisation, storage, recycling and disposal
- Training attendance sheets

Records shall be accessible to appropriate and approved personnel and authorities and shall be retained in accordance with the statutory requirements.

9.0 EHS Reviews

9.1 Site Inspection / Job Planning

Prior to commencement of the Work, the Contractor shall inspect the Site and ascertain whether any health or safety hazards exist. The Contractor will correct identified hazards before commencement of the Work or will take steps to prevent personnel exposure to the hazard. The Contractor will document this inspection and prepare Job Safety Plan to deliver to the Contractor's employees or Subcontractors in pre-job safety meetings. A copy of the document will be maintained at the Site and made available to the Company.

The Contractor shall conduct formal weekly job inspections by the Contractor's Site and safety managers utilizing preformatted checklists. The Company shall



be permitted (but not required) to participate in the Contractor's inspections. The Contractor shall not cause, permit, or tolerate a hazardous, unsafe, unhealthy or environmentally unsound condition or activity over which it has control to be conducted at the Site. All unsafe conditions shall be promptly corrected and documented on inspection reports. All inspection reports shall be made available to the Company. Any conditions which can not be immediately corrected shall be brought to the attention of RasGas.

9.2 RasGas EHS Reviews

RasGas may if deemed necessary carry out EHS reviews over the course of the work or services performed

Such reviews may include but not limited to:-

- Legislative and regulatory requirements
- Evaluation and registration of significant EHS effects
- Evaluation and registration of potential EHS impacts
- Assessment and evaluation of existing EHS practices and procedures
- Conformance with RasGas EHS procedures
- Feedback from previous incidents reports and aspects of non-compliance.

In all instances, normal and abnormal operations of the location/site and potential emergency conditions will be considered in the review process.

In establishing review criteria the following aspects will be considered: -

- Areas where EHS performance can be improved, e.g., injury, incident & near miss reduction, noise level reduction, waste reduction, emissions reduction, reduction of non-conformances, etc
- Environmental aspects of products, services and or by-products e.g. waste and emissions
- Resources consumption
- Use of potentially hazardous processes and materials
- Waste and loss minimisation
- Use and disposal of hazardous materials, products and waste
- Incorporation of EHS controls in design and operation
- Adequacy of resources
- EHS training criteria
- Communications on EHS factors
- Records and non-compliance review procedures
- Capacity to handle environmental and other emergencies

Review reports shall include details of problems and deficiencies and suggest order of priority for dealing with these.



9.3 EHS Audits and Assessments

During the course of the work a number of EHS audits/assessments may be conducted by RasGas at agreed intervals. These audits will be either internal or external depending on requirements and circumstances. The objective and resulting reports for each audit shall identify the following:

- Whether or not EHS policies and procedures are being adhered to.
- Evidence of EHS contacts and compliance in the actual workplace.
- Effectiveness of management systems in communicating the importance of EHS controls
- If the implementation of EHS policies and plans is satisfactory in respect of cost effectiveness and safe operation.

Audits shall be carried out in such a manner that they take into account:-

- The specific activities of each site in respect of: -
 - Operational structure
 - Administrative and operational procedures.
 - Work areas, operations and procedures
 - Documentation, reports and records
 - Actual EHS performance.
- The frequency of the audits based on their EHS impact and importance of individual site activities.
- Contractor's personnel involved in completing EHS audits will be, so far as is reasonably practical, independent to the site being audited.

Audits shall be undertaken by RasGas / Contractor's personnel having expertise in the relevant disciplines required. Auditors will also adopt the necessary protocol, including questionnaires, checklists, interviews, measurements and observations when conducting audits at a particular work sites.

Audit reports will reflect the findings in respect of: -

- Areas of conformity and non-conformity of the EHS policy and procedures
- The effectiveness of the EHS management system in respect of meeting listed controls and objectives.
- The implementation of recommendations arising from: -
 - EHS reviews.
 - Previous EHS audits and assessments.
 - Incidents and emergencies.



10.0 REFERENCES

The following EHS Specifications / Standards / Procedures are available at all times with the RasGas EHS Dept. The Sponsoring Department Representative shall identify the relevant specifications/standards applicable to Works/Services when required.

- RasGas Classification of Hazardous Locations (Doc. No. S-00-1380-001)
- RasGas Security Policy
- RasGas Waste Management Plan
- RasGas Personal Protective Equipment - Selection Criteria, Use and Standards (Doc. No. E01-X02-GENPPE01-001)
- RasGas Respiratory Protection Equipment Fit Test Procedure (Doc. No. E04-X03-FIT064)
- RasGas Standard for Heat Exposure (Doc. No: E03-X02-HSP20-699)
- RasGas Emergency Management System
- RasGas Incident Reporting Procedure (Doc. No. E04-X03-IRP015-299)
- RasGas Onshore Plant Access Control Procedure
- RasGas Permit to Work Procedure (Doc. No. E04-X03-PTW052)
- RasGas Alpha Permit to Work (Doc. No. E04-X03-RXS082)
- RasGas Confined Space Entry procedure (Doc. No. E04-X03-CSE039)
- RasGas Excavation Procedure (Doc. No. E04-X03-EXP042)
- RasGas Radiation Safety Procedure (Doc. No. E04-X03-RSP050)
- RasGas Electrical Safety Rules (Doc. No. P21-X03-Q.06-0002)
- RasGas Forklift Truck Safety (Doc. No. E04-X03-FLT060)
- RasGas Compressed Gas Cylinder Safety (Doc. No. E04-X03CGC058)
- RasGas Tool Safety Procedure (Doc. No. E04-X03-TSP084)
- RasGas Safe Use of Scaffolding Procedure (doc. No. E04-X03-SCA061)
- RasGas Radiation Safety Procedure (Doc. No. E04-X03-RSP050)
- RasGas Job Safety Analysis Procedure (Doc. No. E04-X03-JSA057)
- RasGas Safe Use of Ladders Procedure (Doc. No. E04-X03-SUL083)
- RasGas "Fall Protection Procedure" (Doc. No. E04-X03-FPP043)
- RasGas "Personal Protective Equipment, Selection Criteria, Use and Standards" (Doc. No. E01-X02-GENPPE01-001)
- RasGas Permit to Work Guidance Notes "Guidance D Working Overboard"

British Standards

- BS EN 361:1993 "Specifications for PPE against falls from height, full body harness"
- BS 1139-1990 "Specification for Steel Tube"



**RasGas Environmental, Health &
Safety Requirements for Contractors**

Document No: E04-X03RFC089
Issue No: Original
Date: June 2003

- BS 2037-1994 "Portable Aluminum Ladder"
- BS 2482-1981 "Timber Scaffolds Boards"

American National Standards Institute

- ANSI Z359.1-1992 "Personal Fall Arrest Systems, sub-systems and components" for additional information.

American Petroleum Institute

- API 2214: 1989 Spark Ignition Properties of Hand Tools for additional information.

YD



SECTION 8.0

FORM OF PERFORMANCE BANK GUARANTEE

Handwritten signature

**FORM OF PERFORMANCE BANK GUARANTEE**

1. We, the undersigned (A)..... (hereinafter called the "Guarantor"), established at (B)..... have taken notice of the Agreement No. (C) **CT/RG08/L247/08** dated (D)..... between RasGas Company Limited (hereinafter called the "Company"), a company organised and existing under the laws of Qatar with its registered office at PO Box 24200, Doha, Qatar, and (E)..... a company having offices at (F)..... (hereinafter called the "Contractor"), for (G).....
2. The Guarantor hereby guarantees the due performance by the Contractor of the Contractor's obligations under the Agreement.
3. The Guarantor hereby irrevocably and unconditionally undertakes on behalf of the Contractor to pay to the Company upon first demand, any sum or sums not exceeding (H) **US \$ 84,806 (Eighty Four Thousand Eight Hundred and Six Only)**.
4. Each demand by the Company for payment under this Guarantee shall be made in writing to the following address in the format of the attached Demand for payment.
(I).....
5. The Guarantor shall make payment to the Company hereunder on first demand without restriction or conditions and notwithstanding any objection by the Contractor. The Guarantor shall not require the Company to justify any demand for payment, nor shall the Guarantor have any recourse against the Company in respect of any payment made hereunder.
6. No alteration in the terms of the Agreement made by agreement between the Contractor and the Company, and no failure by the Company to insist on proper performance of the Agreement or to pursue all remedies available to it against the Contractor, shall in any way release the Guarantor from all or any part of its obligations under this Guarantee.
7. The Guarantor shall pay any sum demanded by the Company hereunder within Three (3) working days after the receipt of the Company's demand.
8. This Guarantee shall remain valid from the Effective Date of the Agreement until (J).....



9. The amount of this Guarantee as established pursuant to Section 3 above shall be reduced by the amount of any demands made by the Guarantor to the Company hereunder.
10. Terms used in this Guarantee which are defined in the Agreement shall have the same meaning assigned to them in the Agreement.
11. This Guarantee shall be governed by and construed in accordance with the laws of the State of Qatar, and any proceedings for enforcement shall be brought before the civil courts of the State of Qatar.
12. The Guarantor represents that this Guarantee has been established in such a form and with such substance as to be fully enforceable against the Guarantor in the manner provided in Section 11 above.
13. The benefit of this Guarantee may be assigned by the Company.

(Date)

(Common Seal and Signature of the Guarantor or such other formality as may be required under the law to render a unilateral promise binding on the Guarantor)

- (A) Name of the bank proposed by the Contractor and approved by the Company
- (B) Address of office of Bank
- (C) Reference number of the Agreement
- (D) Effective Date of the Agreement
- (E) Name of the Contractor
- (F) Address of the Contractor
- (G) Description of services or goods
- (H) In figures and letters
- (I) Bank address for notices
- (J) Expiry date for the Guarantee



FORM OF DEMAND OF BANK GUARANTEE

Dated:

To: [GUARANTOR]

Dear Sirs:

RE: Bank Guarantee dated, 200

We refer to the above irrevocable and unconditional Guarantee given by you to us (the "Guarantee"). This letter constitutes a formal demand in accordance with the terms of the Guarantee.

Please note, that the Contractor is in breach of the Agreement and that we have given due notice of the breach to the Contractor.

Therefore, we hereby demand payment of the sum of QAR, pursuant to the Guarantee referred to above.

Such payment shall be transferred to our Bank Account, the details of which are as follows:

Account No.:

Bank Name:

Swift Code:

Regards,

RASGAS COMPANY LIMITED

Name:

Signature:

Title:

Budget
11/2009

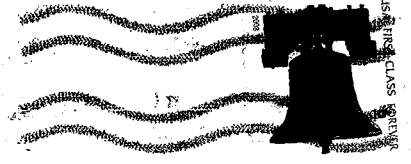
Judy Thompson

(b) (6)



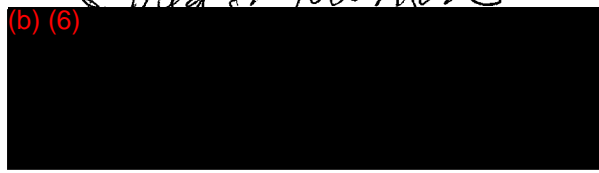
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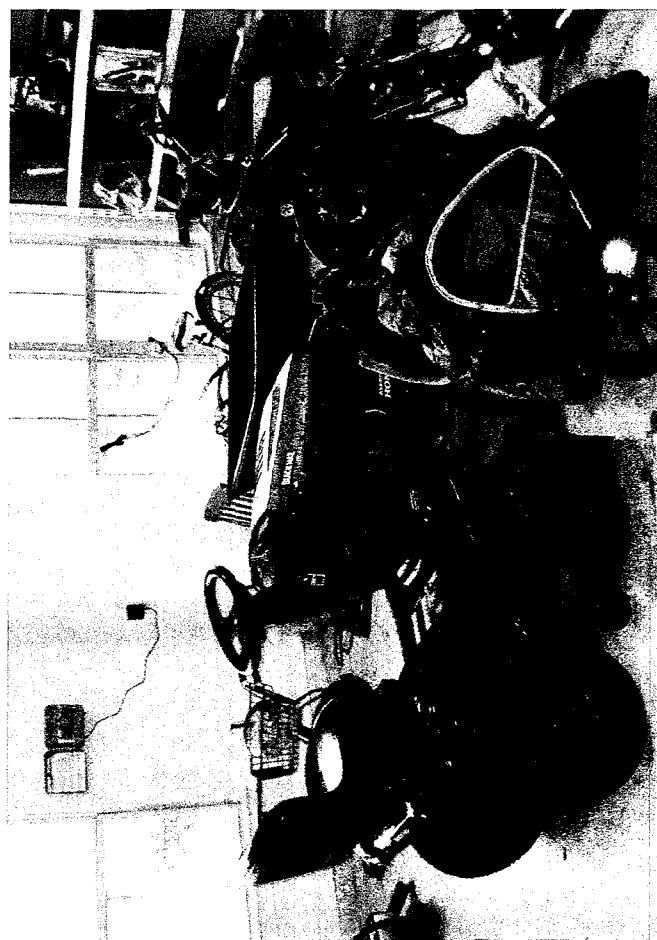
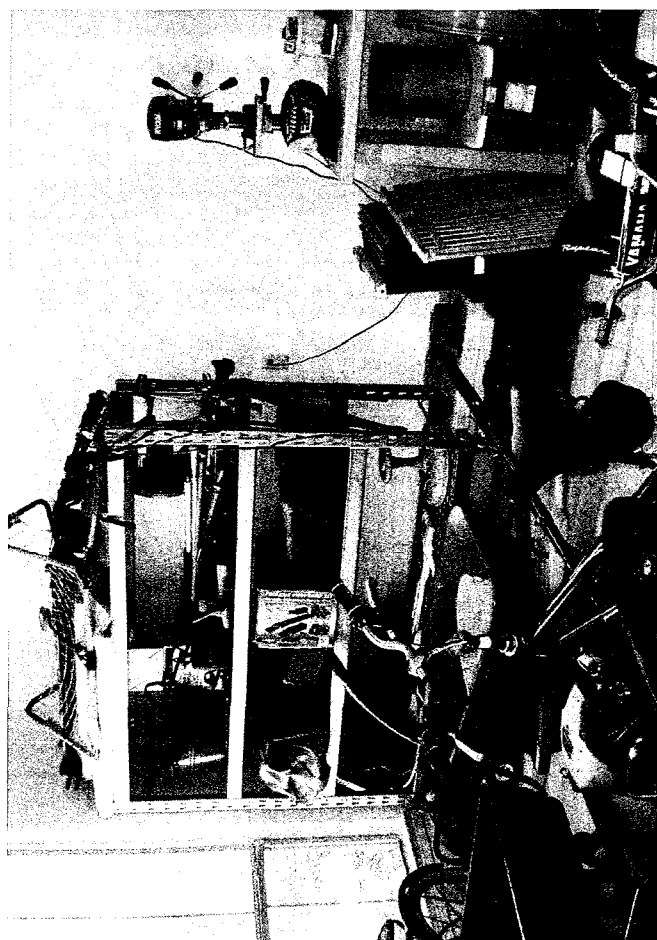
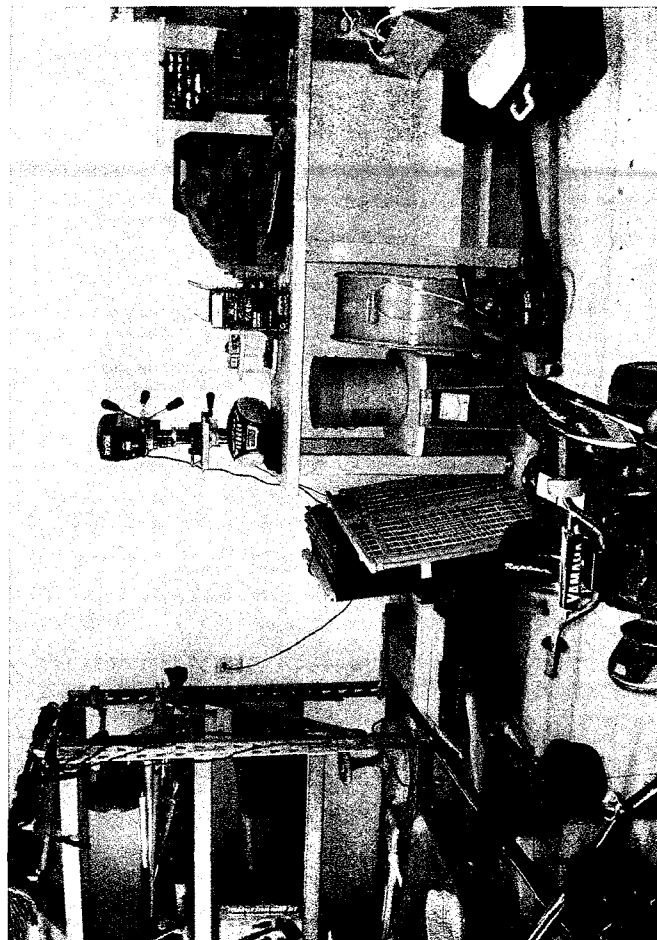
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TARGET SHEET

SITE NAME: CES ENVIRONMENTAL SERVICES

CERCLIS I.D.: TXD008950461

TITLE OF DOC.: [REDACTED] CES ORIGINALS - DISK 5 FOLDER
17

DATE OF DOC.: 07/31/2014

NO. OF PGS. THIS TARGET SHEET REPLACES: 743

SDMS #: 9531704 **RELATED #:** 9531984

CONFIDENTIAL ? ☒ **MISSING PAGES ?** ☐

ALTERN. MEDIA ? ☐ **CROSS REFERENCE ?** ☐

LAB DOCUMENT ? ☐ **LAB NAME:**

ASC./BOX #:

CASE #: **SDG #:**

Pages EPAHO120001969-EPAHO120002712 were
redacted from this document due to FOIA Exemption

COMMENTS : 6 - Personal Privacy.